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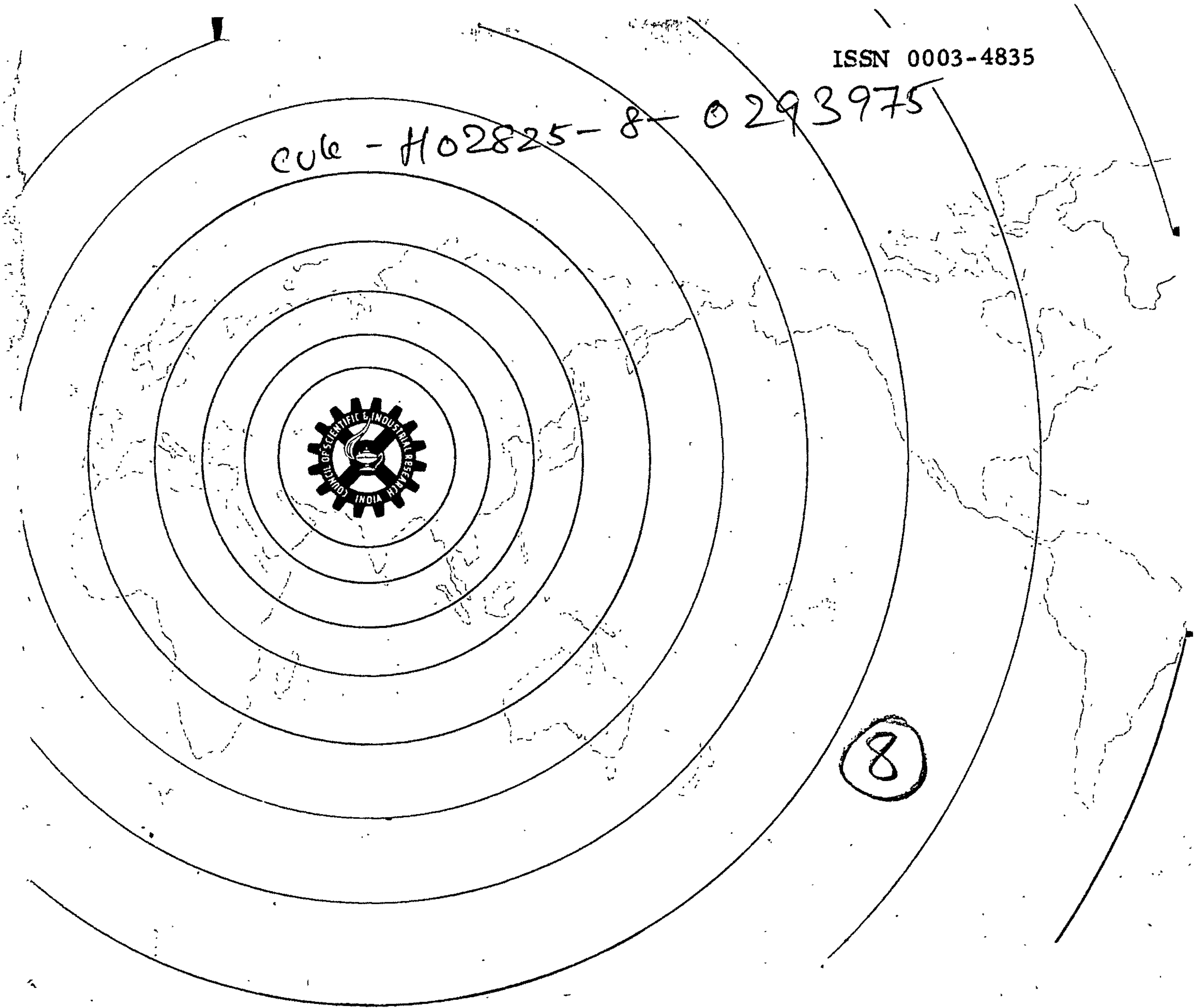

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CHOOSING PHARMACOLOGY PERIODICALS: STUDY OF THE GROWTH OF LITERATURE IN THE FIELD

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New journals covering all the branches of Pharmacology have been brought out and the established ones have either greatly increased in size or frequency of publication or have been split into different titles covering narrower areas in the field. So far no ranking of pharmacological periodicals has been done. This article presents a ranked list covering 229 journals which may be considered the significant sources of pharmacological knowledge. It has been prepared on the basis of counting and analysis of citations in the Annual Review of Pharmacology for 1968, 1969 and 1970. The list reflects the predominantly biochemical and physiological bias of present day pharmacological research, as well as the radical changes that have taken place in its content and directions.

History of Pharmacology

The term pharmacology has its root in the Greek words 'Pharmakon' (drug) and 'logos' (a treatise). Accordingly pharmacology can be defined as the branch of science concerned with the study of the effects of drugs on animals and human being. The drugs and chemicals may be of natural or synthetic origin. For many centuries this science went under the name of 'materia medica' a term coined by Pedanius Dioscorides (A.D. 54). In a broader sense pharmacology can be considered as a branch of biology with close and direct relationship with pathology and bacteriology. Pharmacology at present includes in its scope allied fields like (i) pharmacy (science of collecting, preparing and standardizing drugs); (ii) Inorganic/organic materia medica (sources, descriptions and preparation of drugs); (iii) pharmacognosy (identification of drugs) and pharmacodynamics (the response of living organisms to chemical stimuli in the absence of disease); (iv) chemotherapy (use of chemical agents to combat infectious diseases); (v) therapeutics (treatment of diseases); (vi) toxicology (science of poisons); and (vii) posology (study of doses). Pharmacology is the youngest of the basic medical sciences. In the early stages of its development pharmacology was an offshoot of experimental physiology. At present its scope is enlarging and its rapid growth is one of the most striking features of the development of medical science during the present century. It has multi-pointed relationships with other branches of sciences and as a result we get frontier pharmacological sub-branches such as biochemical pharmacology, molecular pharmacology, steroid pharmacology, and psycho or neuropharmacology.

Medicinal use of plants and fruits were known to man from various early civilizations. The Hindus were among the first people to systematize knowledge of drugs which they kept alive through the ancient writings of Susruta and Charaka. As Castiglioni has observed "in the field of materia medica the contribution of Indian medicine is especially valuable and that has furnished a number of drugs to the pharmacology of the Western people". The snake root Rauwolfia serpentina a source of modern tranquilizing drugs was known and used by the Hindu physicians from ancient times. Medicinal properties of herbs and plants are described in the herbals of Hippocrates (460-377 B.C.), Theophrastus (372-287 B.C.) and Dioscorides. The narcotic properties of opium and diuretic and purgative action of squill etc. was known to the Romans. With the fall of Rome knowledge of drugs flourished in the Arab civilization. Paracelsus (1493-1541) was a pioneer in popularizing materia medica and mineral drugs (e.g. preparations of mercury). He is now-a-days considered one of the pioneers responsible for the development of pharmacology as a separate and distinctive discipline. He was centuries ahead of his time in the clarity and precision of his concepts, believing that the "purpose of chemistry is not to make gold but to study the fundamental sciences and turn them against disease ... Medicine is the purpose of chemistry".

Some significant contributions to pharmacology were made during the 17th century. In 1630 cinchona bark was first used to cure malaria. From this bark two centuries later Caventou, and Pelletier, the French pharmaceutical chemists, isolated the alkaloid quinine which is regarded as the first effective drug to cure an infectious disease. In the same year the French physician Thuillier proved that ergot is responsible for gangrene of the extremities. In 1679 John Wepler established the toxic nature of water hemlock and the convulsant action of Strychnos nux-vomica.

Many important pharmacological researches were carried out by the scientists of the 18th Century. In 1755, Menghini experimented on the chemotherapeutic use of camphor on animals. Louis Cadet (1760) was the first to attach an arsenic atom to a carbon atom. Based on this principle two centuries later Paul Ehrlich prepared the organic arsenical arsphenamine as a drug for syphilis. William Withering in 1783 published an account of the medicinal use of purple foxglove and recommended the use of digitalis in the treatment of dropsy. In 1806, Friedrich Serturner discovered morphine from opium which was followed by the isolation of strychnine (1820) from Strychnos nux-vomica and quinine (1820) from cinchona by Pelletier and Magendie, atropine (1833) from belladona by Geiger and Hesse and cocaine (1859) by Niemann and so on.

L. Scarenzio (1797-1869) instituted the first Italian pharmacological laboratory, while F. Coletti (1819-81) was the founder of the pharmacological Museum in Padua, Italy. Among French Pharmacologists J. B. A. Chevalier (1793-1879) was well known for his studies on food chemistry, E. Soubeiran (1793-1858) for his studies on chloroform, F. A. Jaumes (1804-68) for his famous treatise on pharmacology (1848) and Claude Bernard (1813-78), pupil of Magendie, for his studies on the skeletal-muscle-paralyzing substance curare and carbon monoxide poisoning. Robert Christison (1792-1882) of Edinburgh was widely known for his contributions on toxicology. Francois Magendie (1783-1855), who is considered the father of modern pharmacology, made many outstanding researches on animals with the newly isolated alkaloid strychnine. His scientific study of the action of South American arrow poisons was perhaps the beginning of experimental pharmacology.

Rudolph Buchheim (1820-79) made many important studies on atropine, ergot, solanaceae etc. In 1846 he was made the first professor of pharmacology at Dorpat (Tartu) and Giessen. He was the first to bifurcate pharmacology from traditional therapeutics. The credit of establishing the first exclusive pharmacological laboratory at Dorpat goes to him. The aim of this institute was to carry out researches on experimental pharmacology as an independent part of physiology. It was followed by Schmiedeberg Institute of Pharmacology at Strasbourg. Oswald Schmiedeberg (1838-1921), a student of Buchheim who studied on the mode of action of drugs such as digitalis, muscarin, and poisons using frog's heart is an outstanding personality in the history of experimental pharmacology. More than forty chairs of pharmacology in different universities and medical schools of the world were later occupied by his students. Among them, was John Jacob Abel (1857-1938), the first Professor of pharmacology in the U. S. A. Later, Carl Binz (1832-1913), professor of pharmacology at Bonn, founded the first pharmacological Institute at Bonn in 1869. Sir T. R. Frazier (1841-1920) of Calcutta, and later professor of materia media of Edinburgh University, was one of the first to correlate chemical constitution with the physiological action of drugs.

Though pharmacology was well established in England and some European countries like France, and Germany by the end of the 19th century, it began to flourish in the U. S. A. only with the appointment of J. J. Abel, as professor of pharmacology in the Michigan University (1890) and later in Johns Hopkins Medical School (1892). Before Abel's appointment as Professor of pharmacology the Universities of Michigan and Wisconsin had started departments of Pharmacy in 1868, and 1883 respectively.

In 1910 Paul Ehrlich disvocered arsphenamine as an antisyphilitic drug. Ehrlich described his experimental trials as chemotherapy, a term that continues in use to this day. Some of the most outstanding pharmacological researches relating to bacteriological agents were carried out after 1920. The discovery of drugs like sulphanilamide; penicillin (1929), streptomycin (1943), chloromycetin (1948), and tetracyclines (1952), are landmarks in man's continuous struggle for victory over infectious diseases.

CHOOSING PHARMACOLOGY PERIODICALS

Modern pharmacological researches have taken two courses: (i) chemical, and (ii) biological. The former deals with identification and synthesis of new compounds, and the latter with the physiological effects of active substances.

With the great advances made in electron microscopy and the biochemistry of cellular mechanism during the last twenty years, the study of drug action at molecular and submolecular levels has become possible and opened a new branch of pharmacology known as molecular pharmacology. Neuropharmacology is another important speciality that has come into its own in recent years. Studies in this area are aimed at bridging neurophysiological, neurochemical and behavioural phenomena through the elucidation of the mechanism of action of drugs acting on the central nervous system.

Early Pharmacological Literature

The evolution of earlier macro and micro documents of pharmacology is of particular interest. Perhaps the earliest writings on meteria medica that have come down to us are to be found in the 'Samhitas' of Charaka and Susruta, both compiled around 600 B.C. Both treatises contain descriptions of drugs of vegetable, animal and mineral origin. Theophrastus (370-285 B.C.) compiled a herbal wherein he described nearly 450 plants with indications about their therapeutic value. Hippocrates (459 or 460-355 B.C.) described nearly 300 medicinal plants in his 'Hipocratic Writings'. Pedanius Dioscorides in the first century A.D. compiled a herbal describing all the medicinal plants known in his time. This was regarded for centuries as the leading text on the subject.

Perhaps the credit goes to Nicholas of Salerno of the 11th century for writing the first official work on pharmacology. He wrote his famous 'Antidotarium' in the 11th century. The next important text on this subject was written by Saladinus of Ascoli in 1450. He wrote in his work 'Compendium aromatariorum' on the weights and dosage of drugs prepared from plants, their roots, barks and flowers, their preservation and the organization and conduct of pharmacy. In 1942 Ciriaco Degli Augusti published his famous work 'Lumen apothecariorum' in which he compiled all available information on pharmacology upto that period. 'Thesaurus aromatariorum' by Paolo Suardo (middle of the 15th century) was another book which dealt with many aspects of materia medica. Pietro Andrea Mattioli (1501-77) wrote an encyclopaedic work on pharmacology known as 'Commentary on Dioscorides' in 1554. His work was treated as a classic book on pharmacology for nearly two centuries. Valerius Cordus (1915-44) described nearly 500 new plant species and all his observations were published in a posthumous publication 'Commentary of Dioscarides' (1561). His important work 'Dispensatorium' published in 1535 was regarded as the first official pharmacopoeia of the world.

The Italian pharmacologist G. Orosi's (1816-75) 'Farmacopea italiana' was known as one of the best books on the subject upto the end of the 19th century. Francois Magendie (1783-1855) in his 'Formulaire' (1821) described many scientifically studied remedies. M.J.B. Orfila (1787-1853) wrote on the effects of poisons in his classic work 'Traite de toxicologie generale' in 1813-1815. Jonathan Pereira (1804-53) and K.G. Mitscherlich (1805-71) wrote two books on the subject which have undergone many editions. Joseph Carson (1808-76) of Philadelphia was also a famous writer on materia medica. Rudolf Buchheim (1820-79) in his 'Lehrbuch der Arzneimittellehre' had grouped drugs according to their chemical and pharmacodynamic action rather than according to their therapeutic effects. A. Molina (1830-1905) wrote 'Trattato di materia medica' in two volumes. Carl Binz (1832-1913), Professor of pharmacology at Bonn, wrote in 1866 a text book on materia medica and in 1869 an interesting history of anesthesia. The Dutchman Adolphe Pierre Burggraeve (1806-1902) in his classic publication 'Repertoire Universel de medecine dosimetrique' (1876) tried to base the entire art of drug treatment by the use of alkaloids. Another prominent writer in pharmacology, P. Giacosa (1853-1928) was the author of 'Trattato di materia medica'. The best work of Sir Thomas Lauder Brunton (1844-1916) is 'Textbook on Pharmacology and Therapeutics' (1885). Another standard book on pharmacology in English was 'A treatise on therapeutics, comprising materia medica and toxicology, with especial reference to the application of the physiological action of drugs to clinical medicine' written by H.C. Wood (1841-1920) which underwent 14 editions during the period 1874-1908. Official pharmacopoeias began publication with the French Code in 1818, and U.S. Pharmacopoeia in 1820. The British Pharmacopoeia was published in 1864.

Pharmacological Journals

From a study of the World List of Scientific Periodicals we find that pharmaceutical journals started publication from the earlier part of the nineteenth century. The first one was published in Paris in 1809 under the name 'Bulletin de pharmacie' which was renamed 'Journal de pharmacie et de chimie', in 1842 and ran in the same name upto 1942 which along with 'Bulletin des sciences pharmacologiques' (1899-42) is now being published under a new title 'Annales pharmaceutiques francaises' from Paris in 1943. It may be mentioned here that in the middle of the 18th century in Paris there was a publication of combination nature with pharmacy as one of its groups. It ran from Vol. 1-95 (1754-94) under a long title 'Journal de Medecine, Chirurgie et Pharmacie etc'. Some of the earlier French journals on the subject were 'Repertoire de pharmacie et Archives de pharmacie' (1844-1926); 'Societe de pharmacie de Bordeaux, Bulletin' (1860), 'Archieves de medecine et de pharmacie militaires' (1883-35); 'Archives de therapeutique' (1898-1917), 'Bulletin des sciences pharmacologiques' (1899-1942); 'Archives de medecine et de pharmacie navales' (1911-40); 'Revue d'Histoire de la pharmacie' (1913).

In Germany 'Archiv der Pharmazie' started publication in the year 1822. When the German Pharmaceutical Society was founded in 1899, 'Archiv der Pharmazie' beginning with Vol. 262 (1924), combined with 'Berichte der Deutschen pharmazeutischen Gesellschaft' to form 'Archiv der Pharmazie und Berichte der Deutschen pharmazeutischen Gesellschaft' to form 'Archiv der Pharmazie und Berichte der Deutschen pharmazeutischen Gesellschaft' (1924) which was suspended with Vol. 282, No. 5/6 (1944) and resumed publication in 1950 beginning with Vol. 283, No. 1 (1950). The first abstracting periodical in the field of pharmacy 'Pharmazeutisches Zentralblatt' was published from Germany in 1830. It is still continuing in the name 'Chemisches Zentralblatt' from 1856. Some of the other 19th century German publications in this field are 'Jahresbericht der Pharmazie' (1842-1942); 'Zeitschrift fur Pharmazie' (1849-59); 'Pharmazeutische Zeitung' (1855-); 'Pharmazeutische Zentralhalle fur Deutschland' (1859-); and 'Bericht der Deutschen pharmazeutischen Gesellschaft' (1891-1923); 'Apothekerzeitung' (1886) which is being published with Vol. 62, No. 15/16 (Aug., 1950) as 'Deutsche Apothekerzeitung'. In 1873 Schmiedeberg in collaboration with Naunyn founded the most renowned pharmacological journal of the world 'Archiv fur experimentelle Pathologie and Pharmakologie'. To this day it is published as 'Naunyn-Schmiedebergs Archiv fur Pharmakologie' and is considered one of the leading journals in pharmacology.

Italian pharmacologists were well served by a number of journals published in Italy during the 19th century. Noteworthy among them are 'Annali di farmacoterapia e chimica biologica'. (1824-1900); 'Giornale di farmacia di chimica e di science affini' (1852-1936); 'Annali di chimica e farmacologia'; 'Archivio di farmacologia e terapeutica' (1893-1912); 'Giornale di farmacia' (1896-); and 'Archivio di farmacologia sperimentale e scienze affini' (1902-).

In 1852 The American Pharmaceutical Association was founded in the U.S.A. Some of the earlier American publications in this field are: Philadelphia College of Pharmacy's publication 'American journal of Pharmacy' (1829-) which from vol. 109 No. 1 (Jan., 1937) became 'American journal of pharmacy and the sciences supporting public health', Bulletin of the National Formulary Committee of the American Pharmaceutical Association'; (1831-'51); 'Bulletin of Pharmacy' (1887) which was absorbed by 'Western Druggist' and later became 'Drug Bulletin'; 'Pharmaceutical Archives' (1898); and 'Bulletin of the American Pharmaceutical Association' (1906-11) which continued from 1912 to 1938 in the name 'Journal of the American Pharmaceutical Association'. During 1940-1960 it was divided into 'Practical Pharmacy Edition' and 'Scientific Edition'. The 'Scientific Edition' has been renamed 'Journal of Pharmaceutical Sciences' from 1961. But the best known pharmacological journal of America was founded by Prof. J. J. Abel in collaboration with Prof A. R. Cushny 'Journal of Pharmacology and Experimental Therapeutics' in the year 1909, the official organ of the American Society for Pharmacology and Experimental Therapeutics which was founded in 1908.

The Pharmaceutical Society of Great Britain was founded in 1841 and in the same year (1841) their official organ 'Pharmaceutical Journal' started publication. Another noted British publication was founded in 1888 from Edinburgh in the name 'Journal of Comparative Pathology and Therapeutics'. The reputed 'Quarterly Journal of Pharmacy' (Formerly: Quarterly Journal of Pharmacy and Allied Sciences) was launched from London in 1928 which used to publish researches and abstracts on Pharmacy, pharmacology, chemotherapy, biochemistry and kindred subjects, including Transactions of the British Pharmaceutical conference. It was discontinued in 1948 and was superseded by 'Journal of Pharmacy and Pharmacology' beginning with Vol. 1, No. 1 (Jan., 1949). The British Pharmacological Society was established in 1931 and its official organ 'British Journal of Pharmacology and Chemotherapy' afterwards 'British Journal of Pharmacology' was founded only in 1946.

The first journal on this subject in the Netherlands was 'Nederlandsch tijdchrift voor pharmacie, chemie en toxicologie' (1844-01). Another 'Pharmaceutisch weekblad voor Nederland' started from Amsterdam in 1864 and is still going strong.

Some notable journals of the Scandinavian countries are 'Archiv for pharmaci og chemi' (formerly: Archiv for Pharmacie og Technisk Chemie med deres Grundvidenskaber') published from Denmark in 1844; Norsk Farmaceutisk Tidsskrift published in 1876 from Norway; Ny Pharmaceutisk Tidende (1861) and Farmaceutisk tidende (1890) published from Copenhagen and the latter is still continuing in the same name; and from Sweden Hygiea Medicinsk Och Pharmaceutisk Manadskrift (1839-1938); Farmaceutisk Tidskrift (1860-97); and Svensk Farmaceutisk Tidskrift which began publication in 1897 and is still coming out under the same title.

The first Belgian publication 'Journal de pharmacie' started publication from Antwerp in 1845 and was continued upto 1914. After a break of four years it resumed publication in 1919 from Bruxelles in the name 'Journal de pharmacie de Belgique' and is still running in this name. But the leading pharmacological journal published from Belgium is 'Archives internationales de pharmacodynamie et de therapie' which was founded in 1894 and is still considered as one of the renowned medium for disseminating pharmacological knowledge. The third journal of this country which is worth mentioning is 'Annales de pharmacie' published from Louvain and continued from 1895 to 1914.

In Switzerland, the first journal was 'Schweizerische Wochenschrift fur chemie und Pharmazie' founded in 1892 and it continued upto 1913. In 1914, it took a new name 'Schweizerische Apothekerzeitung' and is still continuing. Since 1926, it publishes an important supplement in the name 'Pharmaceutica acta helvetiae'.

Latin America produced 'Revista farmaceutica' from Buenos Aires in 1858 and the Mexican one 'Farmacia Mexico' started in 1890. Both these journals are still running. From Toronto 'Canadian Pharmaceutical Journal' started in 1868, while the 'Australian Journal of Pharmacy' was founded in Melbourne in 1886. The first journal on the subject from Japan was 'Journal of the Pharmaceutical Society of Japan' started in 1881 and still continuing. The Russian publications 'Farmatsevticheskii zhurnal' and 'Zhurnal meditsinskoi khimii i farmatsii' were launched in 1879 and 1895 respectively. Spain had also one publication which started in 1890 in the name 'Farmacia Moderna'.

Growth of Pharmacology Literature

However, prior to and in the earlier part of the 19th century workers in materia medica (as pharmacology was then known) had to publish their findings in medical journals or in journals of allied fields like physiology, bacteriology etc. From a study of 'World List of Scientific Periodicals', ed. 4, and its 1968 supplement it is seen that from the beginning of the 20th century there has been a steady increase in the number of journals in the field of pharmacology. Thus we see that the number of pharmacological journals which was 69 in 1900 rose to 138 in 1920, 242 in 1940, 404 in 1960 and 448 in 1968. From 1969, though the exact figure is not known, it is believed that this upward trend has been maintained. Inspite of this vast increase in the number of specialized journals in pharmacology, a good amount of important research continues to be scattered in journals of physiology, biochemistry, and other basic medical sciences. This is because of the fact that modern pharmacology is thrushing forward into frontier areas like molecular and biochemical pharmacology and neuro-

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pharmacology. It is therefore necessary for the research workers, librarians and documentalists to get a clear idea of the relative importance of journals of pharmacology as well as other disciplines as repositories of newly garnered pharmacological knowledge. Also because of the vast number of journals in this field, a ranked list is essential for the selection of journals for subscription in the libraries of medical research institutes. The present work on the ranking of pharmacological journals has been undertaken with the object of filling this need. Further, during recent years no ranking of periodicals in this field has been made and thus it is expected this table will be of great help for selection of journals on the subject. In the present work the 'Annual Review of Pharmacology', Vols. 8-10, 1968-70 have been taken as the source journals. Advantages of selecting 'Annual Reviews' as source journals have been discussed in an earlier paper.

The results are presented and discussed in this paper.

Terminology and Techniques of this Study

In this communication the term 'Serials' has been used to denote publications brought out in running numbered sequence to be published for an indeterminate period of time, generally at regular intervals normally not more than one year, although irregularity in frequency of publication is not ruled out. Proceedings of congresses, colloquia, meetings etc. held periodically are considered serials in case a parmanent parent organization exists for arranging their publication, otherwise they are treated as books. Also, if the colloquia, lectures etc. are not published in a numbered sequence, they have been noted as non-serial publications. A similar classification has been made for monographs of learned societies. Serial annual publications devoted to recent advances, progress series and other nonprimary serial publications consisting of review articles have been grouped together separately for purposes of analysis. Citations of secondary periodicals have not been included with the serial citations in case the names of primary journals in which the original articles appeared are given. Unpublished data, personal communications, theses and dissertations, reports, papers in press or awaiting publications are noted separately and treated as non-serial citations. All citations published at the end of the articles, within the texts of the article, and in foot notes have been counted.

The journals appearing in the overall ranking list were classified broadly into 22 subject groupings using the U. D. C. scheme as a guide for classification: Psychology; science (general); physics; chemistry; biological sciences (general); experimental biology and medicine; cell biology; microbiology; biochemistry including molecular biology and biophysics; zoology; anatomy; physiology; pharmacology; public health and hygiene; experimental medicine; pathology; medicine (general); medicine (specialities); agriculture; technology; veterinary science; industrial microbiology.

In order to assess growth of pharmacological journals World List of Scientific Periodicals, ed. 4 and its 1968 supplement has been scanned thoroughly and the number of titles devoted to pharmacology noted and a graph (vide fig. 1) drawn to show the increasing number of periodicals in this subject.

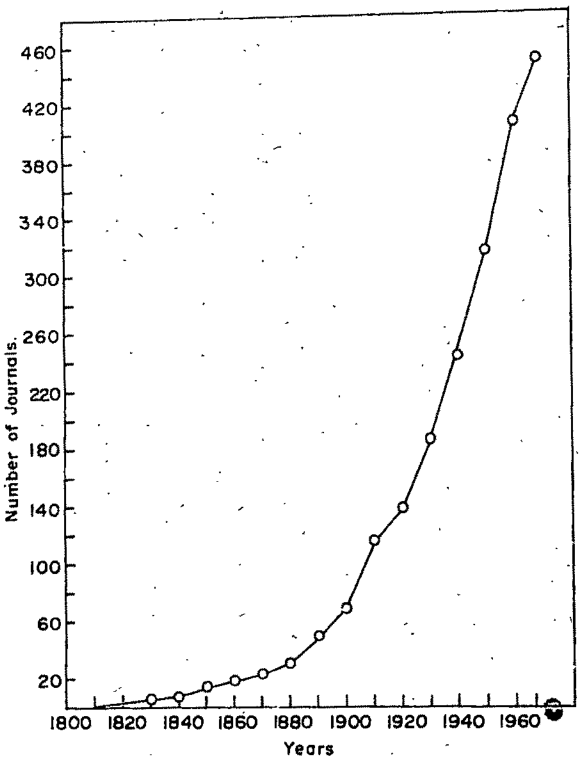
The ranking list is essentially a practical tool designed to help the librarian and research scientist to select the journals of maximum utility in relation to their coverage of new and important literature in particular subject areas. However, because of the large volume of research effort in frontier areas of science where two or more subject fields overlap, publications of importance to an individual area of study tend to appear increasingly in journals devoted to general science or broad areas of science covering more than one speciality. Such journals naturally are voluminous publications. To view the importance of individual titles in clear perspective in respect of a particular area of study it is therefore necessary to analyse the number of citations from a journal in relation to the total number of papers published in a year and the average length of the papers. This has been attempted in respect of the first ten titles in the ranking list in Table 10.

Discussion

Table 1 shows the frequency of distribution of serial and non-serial publications in the ranking list. The pattern is similar to that for other disciplines studied earlier namely, biochemistry, microbiology and

Fig-1

Growth in the number of journals in the field of Pharmacology from 1810-1968



physiology (Sengupta[3-5]). In the present list primary journals and non-primary serial publications together account for 90.25% of all citations, reflecting the importance of serial publications as source material for current ideas and techniques of pharmacological research.

No ranking of journals in pharmacology has been published so far. Table 2 furnishes a ranking list of periodicals in the field of pharmacology compiled on the basis of our study. Journals listed in this table may be considered the media of choice for the reporting of new pharmacological knowledge. The list is expected to be free from any national or regional bias as it has been prepared on the basis of citations counting in A. Rev. Pharmac. which publishes articles reviewing the progress of knowledge in areas of pharmacological research written by leading workers in the concerned topic drawn from different parts of the world entirely on the basis of current scientific interests. It should therefore be a reliable tool for the selection of journals in pharmacology in order of their impact on current research in the subject. In the present study 781 titles have been noted and out of these only the first 229 titles have been shown in table 2. The remaining 552 titles which have been referred to less than 6 times i.e. less than 1% as frequently as the highest cited periodical; have been left out so that the list may not be unduly lengthy; 15, 43, 70, 144, 280 titles have been cited 5, 4, 3, 2, 1, times respectively. The present ranking list should be of use to research scholars, librarians and documentalists concerned with pharmacological research to formulate their acquisition policy for serial publications and for the preparation and circulation of documentation lists emphasizing the contents or abstracts of highly ranked periodicals for the guidance of potential readers.

Significant points brought out by this ranking list are that apart from journals specifically devoted to pharmacology which occupy ranks 1, 3, 6, 14, 17, 20, 25, 26, etc., general science journals occupy very high ranks, as do also journals of physiology; biochemistry; chemistry; and medicine.

The high frequency of citations of general science journals (c.f. rank nos. 2, 5, 8, 26, 28 etc) suggests that pharmacology is going through a phase of intense activity in border areas of biology, so that the results of present pharmacological research are of relatively wide scientific interest and significance to biology as a whole.

The large proportion of journals in physiology (c.f. rank nos. 4, 12, 14, 22, 30 etc) and biochemistry (c.f. 6, 10, 24, 29, 34, 38, 41 etc) is indicative of the lively interaction between advancing areas in pharmacology and these sciences, and also the increasing orientation of pharmacology to biochemical concepts.

Since earlier ranking lists are not available, it is difficult to judge in which direction the ranking of journals of general medicine and specialized medicine has changed in respect of their impact on pharmacological research. But it appears likely that journals of general medicine may have somewhat lost their primacy as sources of new pharmacological knowledge. On the other hand, the frequency of citations of specialized periodicals like Circulation, Cardiology etc reflect the increasing preoccupation of medical research with metabolic diseases in place of infectious diseases, the latter being no longer of major importance to the medical scientist following the success of the chemotherapeutic approach in the treatment of infectious diseases. The relatively high positions occupied by journals like Biochem. Pharmac; Molec. Pharmac.; Psychopharmacologia; J. Neurochem.; Int. J. Neuropharmac. again indicate the presently active areas of pharmacology, particularly the study of drug action at the cellular and molecular levels, and neuropharmacology.

Few journals of microbiology have high ranking, as would be expected from decreasing medical interest in infectious diseases; significantly the journal "Virology" has the highest ranking among the journals of microbiology pointing to the continuing research interest in viral diseases as well as the relevance of advances in virology to biological studies at the molecular level.

There is considerable disparity in ranking among the journals devoted to pharmacology (c.f. rank 1, 3, 14, 17, 20, 25, 26, 35, 36, 43 etc.). Their relative positions may possibly reflect the degree of editorial effort to re-orient emphasis on the frontier areas of pharmacology.

Table 3 brings out the importance of citations from sources other than primary journals (16.0%). As in the case of biochemistry, microbiology and physiology here also citations of non-primary serials (6.25%) are the highest. The second and third places are occupied by books etc. (6.07%) and irregular symposia (1.7%) respectively. From this table, the importance of books, monographs etc as sources of present pharmacological knowledge is evident. This is perhaps due in part to the revival of the practice of reporting original results in monographs.

Table 4 furnishes an analysis of the first twenty-five journals in the present ranking list in relation to their ranking in Sengupta's lists for medicine[6], biochemistry[3], microbiology[4] and physiology[5]. Considering the number of titles from among these twentyfive that find a place in the ranking lists for other disciplines, the impact of general medicine and physiology would appear to be the most significant on current pharmacological research. However this inference may not be entirely valid in view of the large proportion of general science journals in all the ranking lists. When the average ranking of the titles pertaining to individual disciplines in the list is considered, journals in the biochemistry list are seen to rank highest. That is to say, journals with maximum impact on current biochemical research have also a greater impact on pharmacological research as compared to general medicine, microbiology and physiology. However, the average ranking of journals finding a place in the microbiology list is misleading: there is not a single title of a journal specifically devoted to microbiology among the first 25 titles of the pharmacology list. This brings out a feature of present day pharmacological research to which reference has been already made namely, that microbial diseases have ceased to be of major interest to pharmacologists. However, as judged from the number of titles from among the first 25 in the pharmacology list that find a place in the physiology list and their average ranking, physiological research is seen to have a continuing impact on pharmacology, as would be expected from the traditional inter-relationship between these two disciplines.

Table 5 furnishes a ranking list of important non-primary serial publications in the field of pharmacology. It brings out the importance that Pharmac. Rev., A. Rev. Pharmac. and other reviewing journals in related fields have come to occupy in the literature of pharmacology and also the usefulness of "progress" and "recent advances" series in present day research in pharmacology.

Table 6 presents an analysis of citations of the first twentyfive journals of the present list according to period of publication of cited articles. Citations of each journal have been grouped into eight sequences namely, prior to 1901, 1901-'20, 1921-'40, 1941-'50, 1951-'55, 1956-'60, 1961-'65, 1966-'70. It is seen that 49% of total citations of these 25 journals relate to the period 1966-'70 as compared to 65, 55 and 66% respectively in the case of biochemistry, microbiology and physiology reported in our earlier studies. For the period 1961-65, the proportion is 34% in the present list as compared to 27, 31 and 26% in the case of biochemistry, microbiology and physiology, and for 1956-60 it is 9%, the corresponding figures for biochemistry, microbiology and physiology being 5, 9 and 5% For the sequences 1951-55, 1941-50, 1921-40, 1901-20 and prior to 1901, the percentage citations of the first 25 journals in the present list are 4, 2, 1, 0, 4 and 0.04% respectively.

As a rule the frequency of citations increase exponentially with proximity to the date of publication. About 92% of citations are to papers published during the last 15 years. The proportion is even higher (95-98%) in the case of papers in general science journals. These are features characteristic of phases of rapid growth and qualitative changes in the pattern of research effort in a discipline.

Interestingly, in the case of journals of biochemistry and physiology there is a relatively greater frequency of citations to papers published before 1955. This may reflect the increasing application of the established concepts and techniques of biochemistry and physiology in current pharmacological researches.

The lower frequency of citations of journals published during the 5 years preceding our study (49%) as compared to biochemistry (65%) and physiology (66%) is possibly a consequence of the time lag between the development of new techniques and concepts in the latter disciplines and their application in pharmacological research, an observation made also in respect of microbiological research. Except in the cases of J. Pharmac. exp. Theor.; J. Physiol., Lond.; J. biol. Chem.; J. Am. med. Ass.; Lancet and Naunyn-Schmiedebergs Arch. Pharmak. exp. Path. no references to articles earlier than 1921 are noted.

Table 7 gives an analysis of the first 229 periodicals of the present list according to subject classification. Out of the 22 subject classifications, five namely, pharmacology (22.7%), medicine (specialities) (14.7%), physiology (13.4%), science, (general) (12.8%) and biochemistry (10.9%) cover nearly 75% of the total citations. The major scientific disciplines with which present day pharmacological research interacts and which influence its content and directions are clearly brought out as physiology and biochemistry. Similarly the increasing interest of pharmacology in the diseases of present day medical importance like cancer, heart disease etc. is underlined by and large proportion of citations from medicine (specialities). The frequency of publications from science (general), as pointed out earlier, brings out the impact of pharmacology on current biological knowledge.

Table 8 furnishes the frequency of English and non-English journals in the ranking list. From the table it is evident that English (72.9%) is the bias language and thus the main medium of communication in present-day pharmacological research. Multilingual journals (15.7%) with text in English, French and German come second (although even in these contributions in English usually preponderate), while journals with their text in French, Russian and German account for only 3.06%, 2.62% and 1.75% of the journals in the ranking list. Here also as in Brown's[7] and our previous studies (3-6) the loss of importance of German as a medium of scientific communication is seen to have been an irreversible trend, the more so because many German periodicals. e.g. Biochem. Z. has been changed to Eur. J. Biochem.; Pflugers Arch. ges. Physiol. to Pflugers Arch. Eur. J. Physiol.; are now being brought out in multilingual form with a view to greater international involvement. Further, the growing importance of international journals is brought out in this table since as many as 42 journals in the list are being published in the multilingual form.

Table 9 shows the countrywise distribution of journals in the present list. U.S.A., U.K., Germany, France, Netherlands, Switzerland, Denmark and U.S.S.R. figure as the main publishing countries of pharmacological periodicals. If percentage of citations is considered in relation to the number of journals, the scientific impact of the journals from Belgium, Sweden and U.K. are seen to be markedly greater.

Table 10 provides an analysis of the number of citations in relation to size and average length of the papers published. The analysis yields two parameters which should be useful in assessing the actual scientific interest of a journal in relation to the total number of papers published (D/A), and the scientific value of the papers in relation to compactness of presentation (D/C) (Sengupta[3]). It may be seen from this table in the case of the first 10 titles of the present ranking list, reranking on the basis of D/A i.e. frequency of citation in.

relation to total number of papers published, puts the titles in the order: i) J. Pharmac. exp. Ther.; ii) Br. J. Pharmac.; iii) J. Physiol., Lond.; iv) Biochem. Pharmac.; v) Proc. Soc. Exp. Biol. Med.; vi) Nature, Lond.; vii) Science, N.Y.; viii) Ann. N.Y. Acad. Sci.; ix) J. biol. Chem.; x) Fedn. Proc. Fedn. Am. Socs exp. Biol. When we rerank the first 10 titles according to D/C i.e. frequency of citation in relation to compactness of information content the order becomes: i) J. Pharmac. exp. Ther.; ii) Br. J. Pharmac.; iii) J. Physiol; Lon.; iv) Fedn. Proc. Fedn. Am. Socs exp. Biol; v) Biochem. Pharmac.; vi) Nature, Lond; vii) Proc. Soc. exp. Biol. Med.; viii) Science, N.Y.; ix) Ann. N.Y. Acad. Sci.; x) J. biol Chem.

We are of the view that the parameter (D/C) is a good index of value to the research worker and may prove to be a better guide to selection of journals for subscription than position in the ranking list. It is interesting to note, however, that J. Pharmac. exp. Ther. tops the ranking list whether we rank the first 10 journals according to the total number of citation or either of the parameters D/A or D/C which clearly established the premier importance of this journal in the dissemination of new pharmacological knowledge.

Figure 1 shows the growth in the number of pharmacological periodicals from 1810 to 1968. The data for this graph were collected from the World List of Scientific Periodical's[1], ed. 4 and its 1968 supplement[2] (Butterworths, London, 1964 and its 1968 supplement). The shape of the curve indicates the exponential rate of growth of pharmacological periodicals during the period examined. Roughly they doubled in number every twenty years.

Finally the results of this study, as of our earlier studies in biochemistry, microbiology and physiology, support the validity of Bradford's Law of Scattering[8] as extended by Sengupta[3] which states that "during phases of rapid and vigorous growth of knowledge in a scientific discipline, articles of interest to that discipline appear in increasing numbers in periodicals distant from that field. That is, during such phases, the small group of journals accounting for the large part of significant literature in the subject contain a relatively larger proportion of unrelated journals".

A point of concern to all research workers in specialized disciplines of science is the number of journals they should regularly read in order to keep abreast of their subject. At a recent conference of scientific editors at the Royal Society, London[9] general agreement was reported with the findings of Dr. K.L. Blaxter that in any given field of interest 90% of important original work is published in a handful of journals. Full-time research workers can stay abreast of their subjects by taking no more than 12 of the hundreds of journals in their field. From our ranking list it would appear that 33.4% of all citations appear in the 12 journals at the top; but it must be pointed out that the technique we have adopted for preparation of the list does not permit of a qualitative assessment of originality and importance. It may well be that the journals ranked among the first ten or twelve in the list may contain most of the papers likely to determine future directions of advance. Ranking lists are to this extent limited in their utility to individual specialists, who will have to base their selection of core journals to read on the basis of their own special interests and judgment based on experience.

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TABLE 1

Frequency of distribution of serials and non-serial publications

Nature of citation	Number of citations	Percentage of total citations
Primary journals	9596	84.00
Non-primary serial publications	714	6.25
Non-serial publications	1114	9.75
TOTAL	11424	100.00

TABLE 3

Frequency of citations of publications other than primary journals

Category of publication	Number of citations	Percentage	Percentage of total citations counted
Non-primary serial publication	714	39.06	6.25
Books and monographs (without regular sequence)	693	37.91	6.07
Irregular conference/symposium/proceedings	194	10.61	1.70
Reports	74	4.05	0.65
Theses/Dissertations	20	1.09	0.18
In press and to be published data	14	0.77	0.12
Patents/standards	9	0.49	0.08
Miscellaneous (personal communication, unpublished data, incomplete reference etc.)	110	6.02	0.97
TOTAL:	1828	100.00	16.00

TABLE 2

Ranking list of journals in pharmacology

Rank	Abbreviated name of Journal	Country of publication	Year of publication	Number of citations	Percentage of total citations
1	2	3	4	5	6
1	J. Pharmac. exp. Ther.	US	1909	555	5.78
2	Nature, Lond.	UK	1869	409	4.26
3	Br. J. Pharmac. (formerly: Br. J. Pharmac. Chemother)	UK	1946	276	2.88
4	J. Physiol., Lond.	UK	1878	264	2.75
5	Science, N. Y.	US	1883	245	2.55
6	Biochem. Pharmac.	UK	1958	226	2.36
7	Proc. Soc. exp. Biol. Med.	US	1903	219	2.28
8	Ann. N. Y. Acad. Sci.	US	1823	217	2.26
9	Fedn. Proc. Fedn. Am. Socs. exp. Biol	US	1942	212	2.21
10	J. biol. Chem.	US	1905	168	1.75
11	J. mednl. Chem. (formerly: J. mednl. pharm. Chem.)	US	1958	150	1.56
12	Am. J. Physiol	US	1898	135	1.41
12	J. clin. Invest.	US	1924	135	1.41
14	Acta physiol. scand.	Sweden	1940	127	1.32
14	J. Pharm. Pharmac.	UK	1949	127	1.32
16	J. Am. med. Ass.	US	1883	125	1.30
17	Archs. int. Pharmacodyn. Ther.	Belgium	1895	121	1.26
18	Life Sci.	UK	1962	120	1.25
19	Lancet	UK	1823	116	1.21
20	J. pharm. Sci. (formerly: J. Am. pharm. Ass. Sci. Ed.)	US	1940	108	1.13
21	Anesthesiology	US	1940	107	1.11
22	Endocrinology	US	1917	105	1.09
23	Cancer Res.	US	1941	94	0.98
24	Biochim. biophys. Acta	Netherlands	1947	89	0.93
25	Naunyn-Schmiedebergs Arch. Pharmak (formerly: Naunyn-Schmiedebergs Arch. Pharmac. exp. Path.)	Germany	1873	86	0.90
26	Experientia	Switzerland	1945	83	0.86
26	Clin. Pharmac. Ther.	US	1960	83	0.86
28	Proc. natn. Acad. Sci., U.S.A.	US	1915	82	0.86
29	Biochem. J.	UK	1906	78	0.81
30	Circulation Res.	US	1953	76	0.79
30	Br. med. J.	UK	1857	76	0.79
32	New Engl. J. Med.	US	1928	74	0.77
33	Am. J. Med.	US	1946	71	0.74
34	Comp. Biochem. Physiol	UK	1960	70	0.73
35	Molec. Pharmac.	US	1965	68	0.71
36	J. Am. chem. Soc.	US	1879	67	0.70
38	Biochem. biophys. Res.	US	1959	64	0.67
39	Arthritis Rheum.	US	1958	58	0.60
39	J. Lab. clin. Med.	US	1915	58	0.60

Continued

1	2	3	4	5	6
41	Archs Biochem. Biophys. (formerly: Archs Biochem.)	US	1952	53	0.55
42	J. clin. Endocr. Metab.	US	1941	51	0.53
43	J. gen. Physiol	US	1918	50	0.52
43	Toxic. appl. Pharmac.	US	1959	50	0.52
45	J. exp. Med.	US	1896	49	0.51
46	Ann. intern. Med.	US	1927	44	0.46
47	Acta pharmac. tox	Denmark	1945	43	0.45
47	J. Endocr.	UK	1939	43	0.45
49	Circulation	US	1950	42	0.44
50	Proc. Am. Ass. Cancer Res.	US	1953	41	0.43
51	Am. J. med. Sci.	US	1827	40	0.42
51	Arzneimittel-Forsch.	Germany	1951	40	0.42
53	Virology	US	1955	38	0.40
54	J. Neurochem.	UK	1956	37	0.39
55	Eur. J. Pharmac.	Netherlands	1967	36	0.38
55	Pflugers Arch. ges. Physiol. (Now: Pflugers Arch. Eur. J. Physiol.)	Germany	1868	36	0.38
57	J. Reprod. Fert.	UK	1960	35	0.36
58	Farmak. Toks.	USSR	1938	34	0.35
59	Am. Heart J.	US	1925	33	0.34
60	Int. J. Neuropharmac.	UK	1962	32	0.33
61	Am. J. Cardiol.	US	1958	31	0.32
61	Ann. rheum. Dis.	UK	1939	31	0.32
61	Archs intern. Med.	US	1908	31	0.32
61	C. r. hebd. Seanc. Acad. Sci., Paris	France	1835	31	0.32
61	Toxicon	UK	1962	31	0.32
66	Blood	US	1946	30	0.31
66	Q. Jl. Stud. Alcohol	US	1940	30	0.31
68	Archs Derm.	US	1920	28	0.29
70	J. Neurophysiol.	US	1938	27	0.28
70	Proc. R. Soc. Ser B.	UK	1905	27	0.28
72	Thromb. Diath. haemorth.	Germany	1957	26	0.27
73	Archs envir. Hlth	US	1950	25	0.26
73	Can. med. Ass. J.	Canada	1911	25	0.26
73	Int. J. Lepr.	US	1933	25	0.26
76	Can. J. Biochem. (formerly: Can. J. Biochem. Physiol.)	Canada	1954	24	0.25
77	J. agric. Fd. Chem.	US	1953	23	0.24
77	Acta endocr., Copenh.	Denmark	1948	23	0.24
77	J. Invest. Dermatol.	US	1938	23	0.24
77	J. natn. Cancer Inst.	US	1940	23	0.24
81	Am. J. Obstet. Gynec.	US	1920	22	0.23
81	Chem. pharm. Bull., Tokyo	Japan	1958	22	0.23
81	Electroenceph. clin. Neurophysiol	Netherlands	1949	22	0.23
81	J. chem. Soc.	UK	1849	22	0.23
81	Mems. Inst. Butantan	Brazil	1918	22	0.23
86	Am. J. Psychiat.	US	1921	21	0.22
86	Br. J. Anaesth.	UK	1923	21	0.22
88	Analyt. Chem.	US	1947	19	0.20
88	Br. med. Bull.	UK	1943	19	0.20
88	C. r. Seanc. Soc. Biol.	France	1849	19	0.20

Continued

1	2	3	4	5	6
88	Expl. Cell Res.	US	1950	19	0.20
92	Archs gen. Psychiat.	US	1960	18	0.19
92	Clin. Sci.	UK	1933	18	0.19
92	J. Cell Biol. (formerly: J. biophys. biochem. Cytol.)	US	1955	18	0.19
92	J. clin. Pharmac. J. new Drugs (formerly: J. new Drugs)	US	1961	18	0.19
92	Metabolism	US	1952	18	0.19
92	Tetrahedron Lett.	UK	1959	18	0.19
92	Z. Zellforsch. mikrosk. Anat.	Germany	1925	18	0.19
99	Am. J. vet. Res.	US	1940	17	0.18
99	Can. J. Physiol. Pharmac.	Canada	1964	17	0.18
99	Eur. J. Biochem. (formerly: Biochem. Z.)	Germany	1967	17	0.18
99	Fert. Steril.	US	1950	17	0.18
99	Gastroenterology	US	1943	17	0.18
99	J. cell. Physiol. (formerly: J. cell. comp. Physiol.)	US	1932	17	0.18
99	Proc. R. Soc. Med.	UK	1907	17	0.18
106	Aerospace Med.	US	1930	16	0.17
106	Aust. J. exp. Biol. med. Sci	Australia	1924	16	0.17
106	Cancer Chemother. Rep.	US	1959	16	0.17
106	J. appl. Physiol.	US	1948	16	0.17
106	J. nerv. ment. Dis.	US	1874	16	0.17
111	Archs Ophthal.	US	1869	15	0.16
111	Expl. Brain Res.	Germany	1966	15	0.16
111	J. Immun.	US	1916	15	0.16
111	J. theor. Biol.	UK	1961	15	0.16
111	Psychonomic Sci.	US	1964	15	0.16
116	Acta med. scand.	Sweden	1919	14	0.15
116	Helv. chim. Acta	Switzerland	1918	14	0.15
116	J. Bact.	US	1916	14	0.15
116	J. Pediat.	US	1932	14	0.15
116	Klin. Wschr.	Germany	1922	14	0.15
121	Acta anaesth. scand.	Denmark	1957	13	0.14
121	Brain Res.	Netherlands	1966	13	0.14
121	J. Ass. off. agric. Chem.	US	1915	13	0.14
121	J. Psychiat. Res.	UK	1961	13	0.14
121	J. molec. Biol.	UK	1959	13	0.14
121	Psychosom. Med.	US	1939	13	0.14
127	Bull. envir. Contam. Toxic.	US	1966	12	0.13
127	Invest. Ophthal.	US	1962	12	0.13
127	J. Dairy Sci.	US	1917	12	0.13
127	J. Urol.	US	1917	12	0.13
127	Laboratory Invest.	US	1952	12	0.13
127	Pediatrics, Springfield	US	1948	12	0.13
127	Proc. Int. Pharmac. Meet.	UK	1961	12	0.13
134	Am. J. Ophthal.	US	1884	11	0.11
134	Am. Zool.	US	1961	11	0.11
134	Acta rheum. Scand.	Sweden	1955	11	0.11
134	Br. J. Haemat.	UK	1955	11	0.11
134	Cancer, N.Y.	US	1948	11	0.11
134	Cold Spring Harb. Symp. quant. Biol.	US	1933	11	0.11

Continued

1	2	3	4	5	6
134	Helv. physiol. pharmac. Acta	Switzerland	1943	11	0.11
134	Hoppe-Seyler's Z. physiol. Chem. (cited as: Z. physiol. Chem.)	Germany	1877	11	0.11
134	Jap. J. Pharmac.	Japan	1951	11	0.11
134	Med. J. Aust.	Australia	1914	11	0.11
134	Neuropsychopharmacology	Netherlands	1961	11	0.11
134	Vop. Onkol.	USSR	1955	11	0.11
146	Fd. Cosmet. Toxic.	US	1963	10	0.10
146	J. exp. Analysis Behav.	US	1958	10	0.10
146	J. exp. Biol.	UK	1930	10	0.10
146	J. Insect. Physiol.	UK	1957	10	0.10
146	Presse med.	France	1893	10	0.10
146	Proc. Am. chem. Soc.	US	1876	10	0.10
146	Steroids	US	1963	10	0.10
153	Acta ophthal.	Denmark	1923	9	0.09
153	Archs int. Physiol. Biochim. (formerly: Archs. int. Physiol.)	Belgium	1955	9	0.09
153	Dokl. Akad. Nauk SSSR	USSR	1922	9	0.09
153	J. comp. physiol. Psychol.	US	1947	9	0.09
153	Zh. Evol. Biochim. Fiziol. (Cited as: J. Evol. Biochem. Physiol.)	USSR	1965	9	0.09
153	Med. Clins N. Am.	US	1917	9	0.09
153	Medna exp. (formerly: Medna Pharmac. exp.)	Switzerland	1959	9	0.09
153	Vet. Rec.	UK	1888	9	0.09
161	Archs envir. Hlth (formerly: AMA Archs ind. Hlth.)	US	1950	8	0.09
161	Analyt. Biochem.	US	1960	8	0.08
161	Anat. Rec.	US	1906	8	0.08
161	Annls. Inst. Pasteur, Paris	France	1887	8	0.08
161	Antibiotica Chemother.	Switzerland	1954	8	0.08
161	J. clin. Path	UK	1947	8	0.08
161	Natn. Cancer Inst. Monogr.	US	1959	8	0.08
161	Physiologist, Wash.	US	1957	8	0.08
169	Acta chem. scand.	Denmark	1947	7	0.07
169	Acta crystallogr.	Denmark	1948	7	0.07
169	Am. J. Dis. Child.	US	1951	7	0.07
169	Analyst, Lond.	UK	1876	7	0.07
169	Antibiotic Med. clin. Ther.	US			
169	Antimicrob. Ag. Chemother.	US	1961	7	0.07
169	Antibiotic Med. clin. Ther.	US	1955	7	0.07
169	Br. J. Psychiat.	UK	1853	7	0.07
169	Bull. N.Y. Acad. Med.	US	1860	7	0.07
169	Bull. Wld. Hlth. Org.	Switzerland	1947	7	0.07
169	Chem. Commun.	UK	1965	7	0.07
169	Indian J. med. Res.	India	1913	7	0.07
169	Indian J. exp. Biol.	India	1963	7	0.07
169	Ind. Med. Surg.	US	1932	7	0.07
169	Int. J. Neuropsychiat.	US	1965	7	0.07
169	Izv. sib. Otdel. Akad. Nauk	USSR	1958	7	0.07

Continued.

1	2	3	4	5	6
169	Jap. J. Physiol.	Japan	1950	7	0.07
169	J. Allergy	US	1929	7	0.07
169	J. Am. vet. med. Ass.	US	1915	7	0.07
169	J. org. Chem.	US	1936	7	0.07
169	J. Physiol., Paris	France	1946	7	0.07
169	J. Virol.	US	1967	7	0.07
169	Mayo Clinic Proc. (formerly: Proc. Staff Meet. Mayo Clinic)	US	1926	7	0.07
169	Medicine, Baltimore	US	1922	7	0.07
169	Obstet. Gynec., N.Y.	US	1953	7	0.07
169	Scand. J. clin. Lab. Invest.	Norway	1949	7	0.07
169	Technomectrics	US	1959	7	0.07
169	Trans. Ass. Am. Physn.	US	1886	7	0.07
196	Acta physiol. pharmac. neerl.	Netherlands	1950	6	0.06
196	Agressologie	France	1960	6	0.06
196	Am. J. Anat.	US	1901	6	0.06
196	Am. J. trop. Med. Hyg.	US	1952	6	0.06
196	Ann. phys. Med.	UK.	1952	6	0.06
196	Ber. dt. Chem. Ges.	Germany	1868	6	0.06
196	Biol. Bull.	US	1898	6	0.06
196	Biophys. J.	US	1960	6	0.06
196	Br. J. Derm.	UK	1888	6	0.06
196	Bull. math. Biophys.	US	1939	6	0.06
196	Calif. Med.	US	1946	6	0.06
196	Chemy. Ind.	UK	1932	6	0.06
196	Chemotherapia	Switzerland	1960	6	0.06
196	Cur. ther. Res.	US	1959	6	0.06
196	Dis. nerv. Syst.	US	1940	6	0.06
196	Drug Intell.	US	1967	6	0.06
196	Expl. Neurol.	US	1959	6	0.06
196	Farmaco.	Italy	1946	6	0.06
196	Gen. comp. Endocr.	US	1961	6	0.06
196	Izv. Akad. Nauk SSSR (Khim.)	USSR	1954	6	0.06
196	J. Biochem., Tokyo	Japan	1922	6	0.06
196	J. Chromat.	Netherlands	1958	6	0.06
196	J. exp. Zool.	US	1904	6	0.06
196	J. Formosan med. Ass.	Formosa	1954	6	0.06
196	J. gen. Virol.	UK	1966	6	0.06
196	J. Histochem. Cytochem.	US	1953	6	0.06
196	J. Nutr.	US	1928	6	0.06
196	Lipids	US	1966	6	0.06
196	Mimerva Paediat.	Italy	1949	6	0.06
196	Perspect. Biol. Med.	US	1957	6	0.06
196	Radiat. Res.	US	1954	6	0.06
196	Tex. Rep. Biol. Med.	US	1943	6	0.06
196	Therapie	France	1946	6	0.06
196	Publ. Hlth. Rep., Wash.	US	1878	6	0.06
229	Total:			8,571	89.32
552	Other titles (each having citations less than 6)			1,025	10.68
781	G.T.			9,596	100.00

TABLE 4

Analysis of first twentyfive journals in pharmacology of the present list in relation to ranking in Sengupta's lists of medicine and basic biological sciences

Sl. No.	Ranking of first 25 journals in present list for Pharmacology	Ranking in list for Medicine	Ranking in list for Biochemistry	Ranking in list for Microbiology	Ranking in list for Physiology
1	2	3	4	5	6
1.	J. Pharmac. exp. Ther.	49	29	124	36
2.	Nature, Lond.	7	6	4	5
3.	Br. J. Pharmac.	176	75	-	84
4.	J. Physiol., Lond.	19	71	-	1
5.	Science, N. Y.	15	9	10	8
6.	Biochem. Pharmac.	127	52	-	141
7.	Proc. Soc. exp. Biol. Med.	9	27	17	15
8.	Ann. N. Y. Acad. Sci.	17	28	25	23
9.	Fedn. Proc. Fedn. Am. Socs. exp. Biol.	10	12	30	11
10.	J. biol. Chem.	28	1	6	20
11.	J. mednl. Chem.	-	-	-	-
12.	Am. J. Physiol.	4	49	-	2
12.	J. clin. Invest.	1	24	116	14
14.	Acta physiol. scand.	47	-	-	1
14.	J. Pharm. Pharmac.	-	-	-	-
16.	J Am. med. Ass.	8	-	80	105
17.	Archs. int. Pharmacodyn. Ther.	196	-	-	73
18.	Life Sci.	176	47	-	61
19.	Lancet	2	44	54	27
20.	J. pharm. Sci.	-	-	-	-
21.	Anesthesiology	114	-	-	152
22.	Endocrinology	45	22	-	3
23.	Cancer Res.	69	56	36	-
24.	Biochim. biophys. Acta.	30	3	7	13
25.	Naunyn. Schmiedebergs Arch. Pharmack. exp. Path.	217	-	-	102

TABLE 5

Ranking of the first 20 non-primary serial publications

Rank	Name of non-primary serial publication	Number of citations	Percentage of total non-primary serial citations
1	Pharmac. Rev.	153	8.37
2	A. Rev. Pharmac.	102	5.58
3	Pharmacologist	58	3.17
4	Physiol. Rev.	35	1.91
5	Adv. Pharmac.	33	1.81
6	Clin. Res.	26	1.42
7	Adv. Drug Res.	26	1.42
8	Recent Prog. Horm. Res.	25	1.37
9	Prog. Brain Res.	19	1.04
10	Lepr. Rev.	15	0.82
11	A. Rev. Med.	14	0.77
11	A. Rev. Physiol.	14	0.77
11	Int. Rev. Neurobiol.	14	0.77
14	Meth. Med. Res.	13	0.71
14	Prog. Drug Res.	13	0.71
16	Residue Rev.	11	0.60
16	A. Rev. Biochem.	11	0.60
18	Adv. Enzyme Regul.	10	0.55
19	Natn. Cancer Inst. Monogr.	9	0.49
20	Recent Adv. biol. Psychiat.	8	0.44

TABLE 6

Analysis of citations of the first twentyfive journals of the present list according to period of publication of cited articles

Rank	Journal and present ranking (Year of first publication in parentheses)	Upto 1900	1901-20	1921-40	1941-50	1951-55	1956-60	1961-65	1966-70	Total
1	2	3	4	5	6	7	8	9	10	11
1	J. Pharmac. exp. Ther. (1909)	-	(0.54)	(3.24)	(2.88)	(5.77)	(12.25)	(30.09)	(45.23)	555
2	Nature, Lond. (1869)	-	-	(0.24)	(0.24)	(1.71)	(10.27)	(35.70)	(51.83)	409
3	Br. J. Pharmac. (1946)	-	-	-	(3.62)	(4.35)	(10.14)	(30.43)	(51.45)	276
4	J. Physiol., Lond. (1878)	-	(2.27)	(4.55)	(3.41)	(12.88)	(20.45)	(46.62)	(31.82)	264
5	Science, N.Y. (1883)	-	-	(0.41)	(0.82)	(2.45)	(8.57)	(28.98)	(58.78)	245
6	Biochem. Pharmac. (1958)	-	-	-	-	-	(2.65)	(42.92)	(54.42)	226
7	Proc. Soc. exp. Biol. Med. (1903)	-	-	(0.91)	(4.11)	(5.94)	(9.13)	(36.07)	(43.84)	219
8	Ann. N.Y. Acad. Sci. (1823)	-	-	-	(0.46)	(0.92)	(11.98)	(32.72)	(53.92)	217
9	Fedn. Proc. Fedn. Am. Socs. exp. Biol. (1942)	-	-	-	-	(2.83)	(4.72)	(25.47)	(66.98)	212
10	J. biol. Chem. (1905)	-	(2.38)	(2.98)	(6.55)	(7.74)	(16.67)	(32.74)	(30.95)	168
11	J. mednl. Chem. (1958)	-	-	-	-	-	(0.67)	(26.00)	(73.33)	150
12	Am. J. Physiol. (1898)	-	-	(2.96)	(8.89)	(3.70)	(14.81)	(34.81)	(34.81)	135
12	J. clin. Invest. (1924)	-	-	-	(1.49)	(2.22)	(14.07)	(38.52)	(43.70)	135
14	Acta physiol. scand. (1940)	-	-	-	(6.30)	(5.51)	(12.60)	(35.43)	(40.16)	127
14	J. Pharm. Pharmac. (1949)	-	-	-	-	(0.79)	(2.36)	(41.73)	(55.12)	127
16	J. Am. med. Ass. (1883)	-	(0.80)	(2.40)	(5.60)	(3.20)	(10.40)	(32.00)	(45.60)	125
17	Archs. int. Pharmacodyn. Ther. (1895)	-	-	(3.31)	(1.65)	(2.48)	(11.57)	(49.59)	(31.40)	121
18	Life Sci. (1962)	-	-	-	-	-	-	(45.83)	(54.17)	120
19	Lancet (1823)	(1.72)	-	(2.59)	-	(3.45)	(3.45)	(28.45)	(57.85)	116
20	J. pharm. Sci. (1940)	-	-	-	(2.78)	(1.85)	(4.63)	(39.81)	(50.93)	108
21	Anesthesiology (1940)	-	-	-	(0.93)	(2.80)	(6.54)	(23.36)	(66.36)	107
22	Endocrinology (1917)	-	-	-	(0.95)	(0.95)	(2.86)	(40.95)	(54.29)	105
23	Cancer Res. (1941)	-	-	-	(1.06)	-	(9.57)	(39.36)	(50.00)	94
24	Biochim. biophys. Acta (1947)	-	-	-	(1.12)	(2.25)	(6.74)	(39.33)	(50.56)	89
25	Naunyn-Schmiedebergs Arch. Pharmak. exp. Path. (1873)	-	(3.49)	(1.16)	-	(4.65)	(5.81)	(38.37)	(46.51)	86
	TOTAL:	(0.04)	(0.37)	(1.19)	(2.14)	(3.62)	(9.44)	(33.71)	(49.49)	4536

TABLE 7

Analysis of citations according to subject classification of periodicals

Sl. No.	Subject classification	Number of titles in present ranking list	Total number of citations	Percentage of total citations of first 229 journals
1	Psychology	3	34	0.40
2	Science (General)	9	1,095	12.78
3	Physics	1	6	0.07
4	Chemistry	18	375	4.38
5	Biological Sciences (General)	7	410	4.78
6	Experimental Biology and Medicine	6	264	3.08
7	Cell Biology	4	61	0.71
8	Microbiology	6	88	1.03
9	Biochemistry	19	931	10.86
10	Zoology	3	27	0.32
11	Anatomy	2	14	0.16
12	Physiology	25	1,152	13.44
13	Pharmacology	35	1,945	22.69
14	Public Health and Hygiene	4	61	0.71
15	Experimental Medicine	2	58	0.68
16	Pathology	1	8	0.09
17	Medicine (General)	21	661	7.71
18	Medicine (Specialities)	55	1,263	14.74
19	Agriculture	2	36	0.42
20	Technology	1	7	0.08
21	Veterinary Science	4	45	0.53
22	Industrial Microbiology	1	30	0.35
	TOTAL	229	8,571	100

TABLE 8

Frequency of English and non-English journals in the present ranking list

	English	French	German	Russian	English, French, German (multi-lingual with 2 or 3 of these languages)	Multilingual with 4 or more languages of which 3 are E, F, G	Other languages	Total
Number of titles,	167	7	4	6	36	6	3	229
Percentage of all titles	72.93	3.06	1.75	2.62	15.72	2.62	1.31	100

TABLE 9

Countrywise distribution of journals in the present ranking list

Country of publication	Number of journals	Citations of journals in column 2 as % of total
Australia	2	0.32
Belgium	2	1.52
Brazil	1	0.26
Canada	3	0.77
Denmark	6	1.19
Formosa	1	0.07
France	7	1.02
Germany	11	3.85
India	2	0.16
Italy	2	0.14
Japan	4	0.54
Netherlands	7	2.14
Norway	1	0.08
Sweden	3	1.77
Switzerland	7	1.61
U.K.	39	26.36
U.S.A.	125	57.33
U.S.S.R.	6	0.89
TOTAL	229	100

TABLE 10

Analysis of number of citations in relation to size of journal and average length of the paper published

Sl. No.	Name of Journal	No. of papers published during the year (A)	Total No. of pages (B)	Total No. of words (C)	No. of citations noted for 1969 (D)	$\frac{D}{A}$ (No. of citations per paper published)	$\frac{C}{A}$ (Average length of paper)	$\frac{D}{C} \times 10^4$ (No. of citations in relation to overall size of volumes published during the year
1.	J. Pharmac. exp. Ther. Vols. 165-170, 1969	245	2097	1086246	188	0.76735	4433.7	1.73
2.	Nature, Lond. Vols. 221-224, 1969	2297	5317	3349710	165	0.07183	1458.3	0.49
3.	Br. J. Pharmac. Vols. 35-37, 1969	268	1968	716352	92	0.34328	2673.0	1.28
4.	J. Physiol., Lond. Vols. 200-205, 1969	887	5177	1610047	150	0.16911	1815.2	0.93
5.	Science, N. Y. Vols. 163-166, 1969	1209	6057	3694770	83	0.068652	3056.1	0.23
6.	Biochem. Pharmac. Vol. 18, 1969	366	2788	889372	55	0.15027	2430.0	0.62
7.	Proc. Soc. exp. Biol. Med. Vols. 130-132, 1969	911	4000	1628000	73	0.08013	1737.0	0.45
8.	Ann. N. Y. Acad. Sci Vols. 147, 153, 155-68, and 172, 1969	1036	12855	4550670	62	0.05985	4392.5	0.14
9.	Fedn Proc. Fedn Am. Socs exp. Biol. Vol. 18, 1969	3881	1903	1033329	91	0.02345	266.3	0.88
10.	J. biol. Chem.	902	6708	3823560	39	0.03880	4239.0	0.10

IRANIAN SPECIAL LIBRARY STANDARDS

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A set of performance standards suitable for Iranian special libraries are discussed. The purposes of these standards are: to suggest steps necessary for the establishment of special libraries, to achieve satisfactory performance levels in all areas, and to achieve excellence. The paper also describes the criteria or standards by which successful libraries can be judged.

Special libraries have a quite varied nature and are difficult to define. They may serve any kind of government office, a prison, a hospital, bank, corporation, law firm, industrial firm, museum, association, military base, or specialized institute, or, they may be specialized by form of material, such as in a film, record or map library. They may be called information centers, documentation centers, technical information centers, or special libraries. In Iran, most special libraries are in government ministries or other types of government organizations. College, school, public and university libraries are not special libraries, however.

The purposes of these standards are: since relatively few special libraries exist in Iran, (1) to suggest the steps necessary for their establishment; (2) for those recently established, to suggest the steps necessary to achieve satisfactory performance levels in all areas, and finally, (3) for well established libraries, to suggest the steps necessary to achieve excellence. These standards have been approved and are recommended by the Teheran Book Processing Centre, Institute for Research and Planning in Science and Education, affiliated with the Ministry of Science and Higher Education. After a few years of experience in applying them to Iranian libraries, they should be revised and updated.

This document is not intended to form an operation manual, nor is it a textbook in special library administration, nor can it recommend specific quantitative measures which will give automatic excellence. Furthermore, in libraries as varied as these, it is impossible to achieve a high degree of uniformity, so many variations should be expected between libraries. Even so, this document should give a clear guide to the basic elements present and the degree to which they are present in the majority of successful special libraries. In so doing, it describes the criteria or standands by which successful libraries can be judged, also. Most basic of all, however, there must be clearly and unmistakably present at high Iranian management levels the strong intention to make the library a vital and useful part of the organization.

Library Objectives and Initiation

The library should be responsible for providing the materials and services needed to meet all the job-connected information requirements of its parent organization's staff members. Materials of all kinds should be acquired to meet the organization's current and future needs, and they should be organized for most effective use by the library's clientele and staff. The library should attempt to give the maximum service possible with its resources. When aware of its clientele's interests, the library staff can bring pertinent information to their attention, either before a request is received or else at the moment that the information is needed.

A new library should be established only in circumstances which suggest the likelihood that a majority of these standards will be reached within the first five years of operation. Clear understanding of the role, support, and financing of a modern library must be present, the need for such a unit must be obvious to the organization's leaders, and a professional librarian must be available to head it.

Management

The most modern, efficient, and progressive management policies and procedures possible under the circumstances should be used throughout the library. Obviously there is not enough space to describe them here, but they can be learned by studying recent library management and administration textbooks, such as those listed in the bibliography. A written statement of library objectives should be prepared for approval by the person to whom the librarian reports and for staff guidance in developing its program. To aid the parent organization's administration in planning for its growth, at least a five year projection should be made of the library's book collection, personnel and space needs.

All of an organization's libraries should be under one chief librarian. The library should be recognized as a line within the administrative section of the organization, and the chief librarian should be instructed to report to one of several administrative officers — the research department head, the secretariat head, or preferably the organization director himself, or his deputy. Modern management principles call for frequent conferences among those persons working in the library and may be formalized by scheduling regular staff meetings to coordinate activities and reach decisions.

The special library should be considered part of a national system of libraries, closely cooperating to provide maximum service for the entire nation. The well organized library should expect to serve as an internship location for new professional and clerical personnel sent from other organizations for a few weeks of training.

Close, friendly, and business-like relationships should be developed with all other parts of the library's parent organization. Purchases should be made directly by the library, not through the parent organization's business department. The needed items must be identified, their specifications drawn up, sources located, orders placed, and then careful follow up made of each one to insure prompt delivery of the exact items ordered. Payment should be made through the parent organization's business department. Also, the library should be free to establish its own personnel regulations and carry out recruiting, testing, and selection, with final contract signing being handled by the parent organization's business department. Physical plant administration will be carried out under the parent organization's business department.

The chief librarian must insist that his instructions to other departments be carried out as given. Considerable aggressiveness, adeptness at manoevering in a bureaucratic setting and patience are needed by the chief librarian to wend his way through any government organization. Often orders and requests will be processed and approved by the organization's officers only after some delay, so temporary or alternate procedures must be available for any situation.

In certain cases, an organization advisory committee of senior staff members from other departments should be appointed to assist the chief librarian. The committee can be useful in strengthening relations with the organization's staff and in evaluating service to users and administration. It should meet regularly and keep minutes.

An annual report to summarize and evaluate the library's activities should be prepared for the person to whom the chief librarian reports. Monthly statistical summaries should show the volume of use and work done. As a public relations device, brief summary reports may be printed and circulated to all organization staff members.

Personnel

The quality of the library's personnel is one of the most important factors in its effectiveness. No matter what its size, every library should have at least one well qualified librarian, one subprofessional, one typist, and one clerk. As its collection and services expand, additional staff members must be added. A library with large acquisitions and circulation as well as many services might need one hundred staff members. Library staff members should be added at approximately the rate of one for every one hundred parent organization staff members.

The chief librarian should be responsible for all library functions. He should

1. Establish written objectives and policies consistent with the parent organization's objectives and policies.

2. Represent the library in the organization's administrative and planning groups concerned with policy and procedure formulation.

3. Prepare written job descriptions defining requirements, responsibilities, and duties, and suggest salary ranges.

4. Interview and choose from among position applicants in cooperation with the organization's personnel office.

5. Train and supervise professional and subprofessional assistants, specialists, typists, and clerks, and evaluate their performance regularly.

6. Maintain close and effective communication and inform staff members about all policy matters effecting them.

7. Interpret the library's policies and services to the organization.

8. Establish modern policies and procedures for material selection, acquisition, and circulation in the library's special fields.

9. Implement appropriate modern cataloging, indexing, classification, and preparation for the shelves principles and procedures.

10. Plan, organize, and evaluate personalized reference and bibliographic services fitting user needs.

11. Work with architects and space planners on library quarters, furniture and equipment problems.

12. Plan and justify the annual budget.

13. Supervise or perform all services.

Such responsibilities require the chief librarian to know the organization's subject literature and its characteristics, the library's resources, reference and bibliographic methodology, the principles of book selection, acquisitions, cataloging and classification, and to be able to interpret the collection to users. This understanding can best be achieved through graduation from an Iranian or foreign library school supplemented by practical experience calculated to educate the individual in making maximum use of the library's budget and collection to serve users. A combination of both formal subject education in the organization's field of emphasis (e. g. , chemistry or history) and library education is desirable in large libraries. Similar qualifications should be expected of other professional librarians and specialists. A professional librarian is a person who has completed a Bachelors degree major or a masters degree in library science from an approved library school.

The chief librarian should have good administrative ability and a thorough knowledge of the organization's functions and activities. Other desirable personal qualifications include initiative, analytical ability, good judgement, unselfishness, modesty, perserverance and thoroughness in searching for information, emotional stability, flexibility, resourcefulness, tact, and good health. He should have a good knowledge of least one foreign language.

Subprofessional staff members should be responsible college graduates who can carry out difficult tasks relieving professionals of certain duties and supervise typists and clerks. The most capable subprofessionals should be encouraged to prepare for library school attendance and a professional career.

All typist and clerical staff members should have at least a high school education, and most of them should be trained to type bilingually. Special classes should be arranged to teach them certain aspects of their positions. The large library will need many more typists and clerks. They should be accurate, adaptable, friendly, intelligent, unselfish, hard working, and ambitious. Typical typist and clerical duties include ordering publications, checking in and routing periodicals, assisting in technical processing, typing reports and catalog cards, preparing material for the shelves, filing publications and cards, keeping the accession record, circulating and discharging material, sending overdue notices, preparing material for binding, performing photoduplication and messenger work, maintaining and requisitioning supplies, preparing exhibits, and secretarial work.

All employees should be selected because they are well qualified for their positions, and not for family or political reasons. Closely coordinated team work should be expected of the entire staff whose advice should be solicited on matters relating to them. All employees should be hired initially on temporary contracts so they can be evaluated before civil service contracts are given to them. If possible, all persons should be hired to work full-time, 35-40 hours per week, and should be discouraged from sharing their time with other organizations. Women employees are as useful as men and should receive consideration for every position. Each employee is assumed to be a worker, not a watcher. In addition to being informed on current library developments, staff members should be encouraged and supported in study and reading programs related to their positions. Also, they should be encouraged to attend the meetings and to engage in the committee work of the Iranian Library Association and other professional organizations.

In the more advanced special libraries, several other kinds of skilled personnel may be employed, e. g., (a) The Literature Searcher who utilizes his knowledge of a specialized subject literature to make systematic searches, locate specific facts, compile bibliographies, and write reports; (b) The Translator, very proficient in Persian and a foreign language as well as a specific subject field, who translates articles, reports, and correspondence in that field; (c) The Abstractor who uses his writing abilities to summarize the essential factual content of articles and reports for abstract bulletins; and (d) The Indexer who analyses publications in depth by using special subject heading and classification lists.

Collection

The collection consists of the materials made available to the library's clientele. It may include a wide variety of forms and types of materials: books, pamphlets, reprints, translations, dissertations, periodicals, newspapers, press releases, indexing, abstracting and news services, transactions, yearbooks, reports, organization directories, technical reports, research notebooks, patents, specifications, standards, photographs, slides, motion pictures, filmstrips, tapes, discrecordings, maps, sheet music, catalogs, legislative materials, clippings, microfilm, microcards, microfiche, and archival materials.

The chief librarian must establish written book selection and acquisitions policies pertaining to depth and extent of subject coverage, types of materials to be acquired, gifts, and exchanges. This statement should be approved by his supervisor. The librarian is his organization's literature specialist, and, after several years of conscientious study and experience, will know more about the field's literature than any other organization staff member, though others may know more about the subject field itself. An efficient acquisitions program requires sound business practices and simple, well-organized acquisitions records.

The chief librarian can anticipate information needs if he is kept informed about all plans and activities of his organization. Participation in planning sessions and discussions with subject specialists are essential to an alert acquisitions service.

Basic, frequently used, and potentially useful materials should be included in the collection. The range of subjects covered should be determined by the organization's objectives, and the depth of subject coverage in each field should depend on the demand for subject depth. Usually a special library concentrates on a relatively narrow field like chemistry or banking or personnel work and buys material intensively in it. Many Iranian libraries have subject focus problems and need to eliminate all out-of-scope material, such as fiction, from their holdings. The collection's adequacy should be continually re-evaluated as the organization's activities develop.

The size of the collection depends on the amount of material available and pertinent to the organization's needs and interests, on the library's purposes, and on the amount of use received. Some libraries need large reference collections, multiple copies, and historical works, while others have highly selective and practical collections restricted to currently useful literature. The rate and direction of collection growth should reflect the growth of pertinent literature and user requirements. The materials purchased must be well adapted to user understanding levels and needs. Upgrading educational levels within staff specialities may be an important organization goal.

Quality and quantity are both important in the collection. Lists of "good" books in the subject field can be checked against the collection. Such lists are available for foreign language material from the University of Teheran Department of Library Science.

Textbooks should be purchased in limited numbers and should be replaced frequently with more current titles. Duplicates should be purchased only for heavily used titles. In general, the history of the subject field covered is only of secondary interest, its practical aspects being much more useful. Newsletters of only ephemeral value may be discarded after one or two years, while journals of reference value must be bound and kept permanently. Within the organization's subject field, dictionaries, encyclopedias, directories, manuals, handbooks and almanacs will be quite useful. General reference works such as encyclopedias, language dictionaries, atlases, telephone directories, and handbooks, will broaden the scope of the library's reference services, also. Book and serial indexes and abstracting services are very important tools. Library science material will be useful to the librarian's work. Foreign material of all types will be important in many special libraries, perhaps making up 50% to 100% of the collection.

Certain libraries may have as one of their goals the provision of recreational reading material for users; in fact, prison and hospital recreation collections, for example, may have that as their primary objective. They resemble public libraries in their book selection and service policies and need at least three books per user. If the user group contains a large number of illiterates, materials should be available in picture and easy reading form suitable for use in connection with literacy courses. Prison and hospital officials will need access to collections of recent book and serial literature on correctional institution and hospital management.

The library staff must be alert to new sources of material and must systematically review a regular flow of announcements and periodical listings of published material. The Teheran National Library Bibliography should be checked for Persian material, the British National Bibliography for British, Biblio for French, Publishers Weekly, Library Journal, and Special Libraries for American material. The Booklist and Subscription Books Bulletin evaluates foreign reference books. Critical Iranian book reviews may be found in Rahnemaye Ketab, Ayandegan Newspaper and Sokhan. Such journals as Choice and Book Review Digest provide critical reviews of certain English language books. Ulrich's International Periodicals Directory and Soltani's Directory of Iranian Periodicals should be checked for periodical material.

Libraries in organizations issuing publications may exchange them with other organizations here and abroad and thereby enrich their collections at little expense. Central duplicate exchange facilities are available through the Iranian Duplicate Exchange Union at the Iranian Documentation Centre. Attention should be paid to the availability of useful free serials, books and pamphlets. Both solicited and unsolicited gifts that add strength to the collection are desirable.

Material may be ordered by truck or ship from Europe and by ship from other countries. Rush items should be ordered by air mail. Libraries must send a messenger to pick up Iranian publications from other agencies and from publishers as well as to deliver mail. Iranian books must be ordered soon after publication or else they will have gone out of print.

Retention and discard schedules should be established and carried out for each category of material. Discarded accessioned material can be stored in boxes and catalog cards pulled. Discarded unaccessioned material can be sent to the Iranian Duplicate Exchange Union so it can be used by another library, or, if obsolete, misleading, or in bad physical condition, it can be put in the trash.

Since they will not be used, manuscripts and rare books should not be purchased. If they are present, permission should be sought to sell or donate them to a university central library. If it is necessary to keep them, they should be fully cataloged and stored in a vertical file or locked book case in the chief librarian's office.

In general, annual additions should be made at the rate of at least one new book for every second organization staff member. Superior collections may add as many as five new books per staff member. Although no fixed rules can be given for the number of serial subscriptions needed, as with the book collection this depending on breadth and depth of the organization's interests and library use, even a small library must have at least 50 titles and larger ones as many as several thousand. Most of the serials selected for subscription should be those found in the indexing and abstracting.

journals of greatest value to the organization. Current newspapers should be available from Iran and perhaps from several other countries.

An annual inventory of all accessioned volumes should be taken and losses reported so records can be corrected, replacement budget needs estimated and requested. The chief librarian should not be held responsible for the collection losses which always accompany library use, in fact, losses will often increase as the library's usefulness increases.

Processing

The staff must organize the collection efficiently and make available the catalogs, indexes, and guides needed for prompt access to it. Effective organization and control require: 1) bibliographic description of each item, 2) subject analysis, and 3) classification for physical subject arrangement. Policies and procedures for making materials accessible differ according to its physical form, subject content, and use.

Normally, books are indexed in the public card catalog by author, title and several subjects, with the cards intermixed in a alphabetical order. Books are shelved on open shelves by subject classification number. The shelf list, containing a card for each book, is arranged in call number order. Frequently used reference materials should be shelved by subject classification near the circulation or reference desk.

Access to the alphabetically arranged special library serial collection should be obtained through published index and abstract services, e. g., Biological Abstracts, Education Index, and the Irandoc Science and Social Science Abstract Bulletin. Pamphlets and audiovisual material should be indexed by broad subjects in the public card catalog and stored alphabetically by subject, call number, or title in filing cabinets.

Full consideration should be given to the use of the classified catalog arranged in call number order and supplemented by a subject index. It will place in one file the cards for both Persian and foreign books instead of dividing the two sets of cards as in the dictionary catalog. An alternate plan is to file a card for each subject heading in both Persian and Latin catalogs.

Standard modern cataloging, classification, indexing systems and processing procedures should be used. The most popular cataloging system is described in the Anglo-American Cataloging Rules published by the American Library Association. A Persian translation of it is being published by the University of Teheran Central Library. Another important tool is Sharify, Nasser, Cataloging of Persian Works, distributed by the American Library Association. The most popular classification systems are those of the Universal Decimal Classification, the Library of Congress for large collections, and the Dewey Decimal Classification for smaller collections. The Library of Congress publishes the most useful subject heading list. A series authority file is useful, also. Copies of the basic processing tools must be purchased for daily use in the library's initial organization. Careful study will be required before the reader will understand how to use them. Special subject heading and classification expansions available at the Teheran Book Processing Centre may be needed to index adequately specialized Iranian collections.

Printed catalog cards for both Persian and Latin titles can be purchased from the Teheran Book Processing Centre and for Latin titles from the Library of Congress. Such cards will save the cataloguer's time and enable the library to have a neat, attractive, correct and useful catalog at a small cost.

Materials must be accessioned and prepared physically before being placed on the shelves for use. Books must have charge cards, pockets, date due slips, and ownership stamps or book plates placed in them. Plastic book jackets are desirable to enhance appearance and durability, also.

Serials and pamphlets must be checked in and their ownership stamped on each issue. Those with permanent reference value should be bound in annual volumes by a commercial bindery. Book and serial repair facilities should be available in the library.

Material may be ordered, catalogued, classified, and prepared for the shelves for any special library on contract by the Teheran Book Processing Centre which will also serve as a consultant on all types of library problems.

An organization with several libraries should have a union catalog of the book and serial holdings in each one. Processing should not be allowed to take more than one month from the time the book arrives in the library. In the future, greater efficiency may be attained through the use of data processing techniques for bibliographic information storage and retrieval.

Service

The special library is a service unit providing information to improve the caliber of work of the parent organization. Its service program should be dynamic and the staff should seek out opportunities to serve organization personnel. Skilled reference and bibliographic services should be provided, information disseminated, and many activities undertaken to encourage use.

Reference service depends upon the staff's special knowledge and experience, the collection, and outside agencies. The staff should assess and select the appropriate material to answer each reference question received. Answers to requests may be obtained in a time span of several minutes to several hours.

Literature searches conducted in response to specific requests may result in a selected list of references or a collection of publications for examination. Individual reading guidance should be given to any user who wishes to locate his own literature. In certain instances it may be appropriate for the library to assign a staff member to serve as the bibliographical member of an organization research or study committee.

New organization personnel orientation should include a library tour, personal instruction and distribution of a brochure describing the library's services. As information specialists, librarians may advise individuals organizing personal information files. Hours of opening should reflect the extent of users demands. The normal working hours of the parent organization should be the minimum hours observed.

Current periodical literature should be used to the maximum, in ways such as the following: displays of current issues, regular routing to specific individuals, distribution of selected lists of articles, publication of an abstract bulletin, publication of a contents pages bulletin, and purchase of multiple subscriptions for distributions to specialists.

When commercially published indexing and abstracting services are inadequate in the library's subject field, the staff should compile continuing and selective bibliographies, indexes, abstracts, or digests of current literature to meet the future needs of its clientele. If a translation requested is not readily available and cannot be obtained easily abroad, the library should secure it from a well qualified staff member or a local commercial translation service.

The library should circulate its materials for home use, with the possible exception of reference sources. Loan service should include an efficient charging and recall system, with provision for filling users requests promptly. The loan policy must be flexible enough to permit maximum use. No fee should be charged for use. The library may provide photocopies instead of lending individual items. The extent to which the library is useful to the parent organization can be gauged by the extent of its reading room use, circulation, and reference question requests. Though it will vary greatly even in superior libraries, a circulation of one item per organization staff member per month is good, one item per week very good, The number of reference questions answered per week will vary also, and will depend on how the term reference question is defined, but one per organization staff member per year is adequate.

An extensive interlibrary loan program should be carried out with other libraries in accordance with the interlibrary loan code of the Iranian Information Network which has its headquarters at the Iranian Documentation Centre. Close and frequent cooperation with related special libraries and with public and university libraries will extend the usefulness of all Iranian book collections and is the goal of this network.

The special library should publicise its resources through attractive displays, direct routing and acquisition lists of new materials, selective subject lists, publications, and personal contact. Exhibit space and bulletin boards should be used continually and changed frequently to provide attractive displays of material related to library service. Displays may be seasonal or celebrate special events. New services and materials may be publicized in several ways including a notice in the organization's newsletter, distribution of bookmarks and booklists.

Quarters and Equipment

The chief librarian is responsible for a precise and realistic statement of the physical requirements for collections, services, and staff. The library needs adequate facilities in a physical environment conducive to optimum use.

Except for laboratory and desk material needed daily, the organization should place all of its printed books, serials, pamphlets, reports, and other library materials in one place, under the library's supervision. This will concentrate the collection and its service in the hands of well informed staff members in one location open regularly for relatively long hours. This policy is more efficient and economical than scattering these facilities. Since it is a general service used by persons in all departments of the organization, the library should be centrally and accessibly located. Notices should guide the reader to it. The library's quarters should not be shared with any other department.

As the organization grows, the scope and activity of its library will also increase, so its location must permit space expansion for at least five years. Anticipation of growth needs should discourage frequent moving of heavy and cumbersome equipment and materials.

Reference functions require space for staff desks, card catalogs, printed indexes, dictionary stands, map cases, file cabinets, and the reference book collection. A separate service desk may be needed for the loan and return of material. Microfilm readers and photocopiers may be located in the service area, also. Adequate table and carrel space in a quiet area must be provided for reading, study and research. Reading room seats at the rate of 2.5 square meters per person should be available for at least 10% of the organization staff.

The shelving areas for the book and the current and bound periodical collections must be conveniently located in or near the reading room and completely open for reader use. Open shelves allow users to browse among the materials freely and make their own selections. Shelf requirements can be estimated on the basis of standard formulas. Estimates must be made for the growth rate of each call number and the additional shelves needed within a given time.

Dimensions of single-faced book shelving sections: 2 meters and 6 shelves high; for counter height shelving, 1 meter and 3 shelves high; both should be 95 cm. wide, with 23 cm. shelf depth. Shelves must be easily adjustable to many different levels. In stack shelving, useable capacity is 100 volumes per section, or per square meter of floor space. Aisles and passageways should be 1 to 2 meters wide.

The amount of office, processing and conference space needed depends upon the size of the processing and administrative staffs. Office space is needed for conferences and interviews, administrative, clerical and secretarial work. The processing area is used for acquisitions, cataloging, classification, indexing, physical preparation for the shelves, and preparation for binding work. Processing and office space should be located where the necessary typing noise will not distract users. Ample desk, table, counter, cabinet, shelf and aisle space and appropriate equipment placement are necessary in these rooms. A conference room can be useful for committee meetings, private conferences, and small instructional and orientation sessions. Technical processes and office area allotment for each person, including desks, work tables, shelves, and passageways should be 12.5 square meters. 70 footcandles is the level of recommended illumination in all work and reading areas.

Special attention is required to the following: 1) the floor must not be loaded with books in excess of the building's structural allowances, normally a maximum of 680 kgms per square meter; 2) quarters must be free from machinery vibrations, outside noise, and strong odors; 3) adequate ventilation control is needed for book and paper preservation; 4) proper quantity and quality of illumination is required for reading; 5) proper sound control is important, if necessary achieved by acoustical treatment of walls and ceilings; 6) lavatory and mimeograph facilities should be readily available in or near the library; and 7) cooling should be provided in the summer and central heating in the winter.

Needed equipment will include a Latin and a Persian typewriter, kardex, two or more book trucks, several vertical files, work table, sink, storage area for supplies, telephone, wall clock, card catalog cabinets for public catalog and shelf list, desks and photocopy machine. Comfortable lounge furniture will be needed as well as tables, straight chairs and carrels for serious study, projectors for use with film, filmstrips, and microfilm. Needed supply items will include charge cards, identification cards, stationery, accession book, correspondence record book, order cards, LC card order forms, catalog cards, book mending supplies, an electric eraser, date due slips, book pockets, book jackets, scotch and masking tape, book spine labels, card sorters, plastic adhesive, library ownership stamps, date stamps, form letters for ordering free material and claiming missing issues, paper clips, rubber bands, etc. Standardized library equipment, furniture and supply items can be purchased from suppliers recommended by the Teheran Book Processing Centre.

Budget

The initial recommendations for budgetary support should come from the chief librarian, but the final proposal must be shared with his immediate superior. They must agree upon the desired scope of the library's services and the allowable costs.

Spending budget allocations depends on the professional knowledge and judgement of the library staff. The chief librarian should have full responsibility and authority to spend his budgeted funds. Budgetory support must be made available on a continuing basis, without lapses. Otherwise, serial subscriptions will lapse and the collection will contain gaps.

At the very least, there must be an annual budget large enough to cover minimum staff salaries, a representative collection of new material, supplies and equipment. Normally, in a ministry library serving 300 people, for instance, a minimum budget of at least 120000 Rials per month may be expected, about half spent on three staff members and half on new materials. Its annual equipment budget should be at least 30000 Rials, and its annual supply budget should be 7500 Rials. When new, such a library should have an initial budget of at least 250000 Rials for equipment, 300000 Rials for materials, and 10000 Rials for supplies. Probably the organization itself will provide tea, guard, and janitor service, so they need not be budgeted.

The library staff may keep essential financial records, but must also maintain close liaison with the organization's accounting department which will keep the official records. Salaries may be included in the parent organization's personnel budget, the library's own budget covering all other items. A replacement budget to cover losses will be important in certain libraries. A majority of libraries will need foreign currency or Unesco book coupons sufficient to purchase at least three fourths of their materials abroad. Salaries should reflect staff member's education and experience levels and should be comparable to those paid in other fields, such as accounting and architecture. For instance, a masters degree graduate librarian should be paid 25000-45000 Rials per month and a bilingual typist 10000-18000 Rials per month at the present time.

Sources of Assistance

If the definitions and examples of the terms and ideas used in this set of standards are not entirely clear, the librarian can consult the library science glossary published by the Iranian Documentation Centre. It defines many of them in Persian. Or, he can consult the Teheran Book Processing Centre Planning Department.

Useful supplementary reading material is listed below:

American Correctional Association, Manual of Correctional Standards. New York, 1966, Chapter 31, Library Services.

Ashworth, Wilfred, Handbook of Special Librarianship and Information Work. London, Library Association, 1967.

Association of Hospital and Institutional Libraries. Standards for Library Services in Health Care Institutions. Chicago, 1969.

Koontz, Harold and O'Donnel, Cyril, Principles of Management, New York, McGraw Hill Book Company, 1968.

Library Association. Hospital Libraries; Recommended Standards for Libraries in Hospitals. London, 1965.

Sharp, H. S., Readings in Special Librarianship. New York, Scarecrow Press, 1963.

Special Libraries Association, Objectives and Standards for Special Libraries. New York, 1964.

Strable, Edward, Special Libraries, a Guide to Management. New York, Special Libraries Association, 1966.

Strauss, L. J. Scientific and Technical Libraries. New York, Interscience, 1965.

Teheran Book Processing Centre. Iranian Academic Library Standards. Teheran 1971.

Withers, F. N., Standards for Library Service, Paris, Unesco, 1970.

Iran has three library education departments, those at the University of Teheran, Faculty of Education, offering a Masters degree and an undergraduate minor, Tabriz University Faculty of Letters offering a Bachelors degree, and the Iranzamin Junior College of Business and Library Administration, offering a post diploma.

At the present time, the following are among the best organized Iranian special libraries. A visit to one or more of them, should be helpful to anyone planning the organization of a new library.

1. Central Bank Library, Teheran.
2. National Iranian Oil Company Library, Takhte Jamshid Avenue, Teheran.
3. Ministry of Economy Centre for Trade and Industrial Development Library, Teheran.
4. Pahlavi University Faculty of Medicine Library, Shiraz.
5. The Iranian Documentation Centre, Teheran.

WORLD AGRICULTURAL INFORMATION AND AVAILABILITY TO INDIAN AGRICULTURAL SCIENTISTS

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A general survey of output of literature in the field of Agriculture, the coverage of secondary periodicals, the organisations having important collections, etc. is made. A complete picture of agricultural research in India and an account of the information facilities available to an agricultural scientist in India are presented and assessed. Suggestions for new services in the future are also made.

1. *Output of Agricultural Information*

Today, in the world, scientific literature is published in various forms like books, monographs, reference books, bulletins, research and technical reports, periodicals, journals, conference proceedings, annual reports, patents, standards, abstracting periodicals, advances and annual reviews, etc.

1.1 *Source of Publications*

This output of publications can be conveniently classified into four main categories- 1) Books, Monographs, (2) bulletins and pamphlets, (3) scientific and technical reports and (4) periodical literature.

1.11 *Books & Monographs*

Various estimates have been made about the annual output of books etc. Twenty two countries are participating in shared cataloguing with the Library of Congress with their national bibliographies being an input in the system and the total number of publications put in the system figured to more than 200, 000 in 1969. 1971 UNESCO Statistical Yearbook gives overall output of titles as 5, 48, 000. Indian output being 13, 614. It has been further estimated that about 100, 000 scientific books and monographs are produced annually. The National Agricultural Library, Washington had collected from 1865-1965 over 12, 50, 000 volumes. A catalogues of these has been published by it. It has published supplementary catalogue for 1965-70 in which they have listed over 1, 30, 000 volumes. This indicates that over 25, 000 books, etc. are published each year in agrobiological subjects.

1.12 *Bulletins*

Bulletins are published in series by various agricultural experiment stations, universities and research institutes in the world. At least 900-1000 series are currently being published in the world. The total retrospective output of this type of literature easily exceeds 200, 000 publications. This is very important source media for agricultural scientists.

1.13 *Report Literature*

So far scientific report literature is concerned there is a large flow of this material and today they are getting much importance. The International Atomic Energy Agency has published more than 200, 000 research reports. In USA alone more than 75, 000 unclassified reports are produced annually. There are other agencies, which bring out such reports but their figure is not known.

1.14 *Scientific Papers*

A huge number of scientific and technical periodicals are published in the world. The 'World List of Scientific Serials' lists 60, 000 titles. More than 35, 000 scientific serials are published annually, and out of this more than 15, 000 are of agricultural interests. Various estimates have been made about the annual output of contributions made in these periodicals which ranges from one to three million articles. VINITI is reported to be monitoring more than one million articles annually in their abstracting periodicals.

1.15 *Dissertations*

Theses form a valuable source of information for agricultural research workers.

Data pertaining to various dissertations submitted in various countries is not readily available. Recently the University Microfilming Ltd. has published 'A Comprehensive Dissertion Index' in which they have indexed over 400,000 dissertations submitted in various universities from 1861 to 1972, in U.S.A. A breakdown given by them indicated the following number of theses of interest to agrobiological area.

Biological Science:	39,150
Agriculture:	12,300
Chemistry:	55,000

Information about theses in Indian agricultural university libraries has been given in section 2.3.

1.2 Agricultural Research and Subject Areas

Todays agriculture includes agriculture in relation to plant science, forestry, animal husbandry, fisheries, etc. Currently over 3000 scientific institutes, universities, colleges and agricultural experiment stations are busy carrying out R&D activities in relation to agriculture in the world. Numerous subject areas get linked with agriculture. Even if we limit it to plant sciences, to give an elaborate list of subject areas will be a difficult task, some of the subject areas linked are given below:-

Genetics
Plant Physiology

Horticulture
Vegetable Crops
Plant Introduction
Seed Technology

Mycology & Plant Pathology
Entomology
Nematology

Agric. Physics, Meterology
Nuclear Science

Water Technology

Food Processing

Agronomy
Agricultural Engineering

Soil Science & Agric. Chemistry
Agric. Chemicals
Microbiology
Biochemistry

Rural Sociology
Phycology
Extension
Education
Administration

1.3 Agris Survey of Secondary Source Agencies

A recent survey of the secondary source monitoring agencies and informations services in agriculture and related subjects by Sigmund vòn Frauendorfer has been published by Agris. As per this report agricultural subjects are well documented and as many as 700 secondary services throughout the world have been listed by it.

Analysis

Out of these, 514 secondary agricultural documentation services have been further analysed. They are published in 50 countries and in 22 languages. Out of these 50 issue only title lists, while 378 issue titles and abstracts, 31 services are mechanised, with machine readable tapes available, 18 services with a total output of 225,500 references per year, offer a retrieval service. A further analysis of these according to country and languages is been given below:-

Table - 1

Analysis of Secondary Services in Agriculture

Country	Title & Abstract services	References per annum
1	2	3
Czechoslovakia	15	104,050
Germany BRD	73	144,410
Germany DDR	20	63,350
France	30	149,650
U.K.	54	235,210
International	27	67,720
Japan	15	25,070
Portugal		
Soviet Union	73	177,250
U.S.A.	75	224,975
Major Languages: Abstracts Services		
German	72	134,380
English	139	328,605
French	32	68,250
Russian	77	74,050
Major Languages: Titles Services		
Germany	24	48,550
English	48	213,070
Spanish	16	10,900
French	16	96,000

1.4 Items covered in various English language Abstracting Periodicals, retrospective and current

Our main interest is in English language secondary source periodicals. As given above over 187 abstracting and indexing periodicals exist in English language. Some of these have been offering services from 1913 onwards. We have tried to collect and give information about 28 of such agencies with retrospective effect to get some idea of the magnitude of information that has been published and monitored in agrobiological subjects. Periodicals have been broadly grouped as per subject. It is clear that over 2.5 to 3 million items have been monitored by these agencies and scientists must have access to all the information whenever they need them.

The output for 1972 has also been given for the same. It indicates that about 0.25 - 0.3 million items of agrobiological interest are currently being monitored by English language abstracting periodicals. Information given in the serials column indicates that over 10,000-12,000 serial titles are currently being screened by these agencies. CAB is currently monitoring and publishing over 100,000 abstracts in their computer produced periodicals from 1973.

Chemical Abstracts is a vital source of information for all scientists including agricultural scientists. Currently it is covering over 14,000 serials and publishing over 3,40,000 abstracts. We have given retrospective data about this periodical in section 1.69.

1.5 Information on Individual Crops

Even on single crops like wheat, rice, tobacco, etc. enormous amount of literature has been published in the world. Information taken from some of the standard bibliographies and abstracting periodicals provide data given in Table 3 (page 36).

1.6 Some Retrospective Information Files

Retrospective information files form one of the most important source media to agricultural scientists. Such files exist at many places. In succeeding paragraphs some of the important files have been very briefly outlined:

1.61 Wealth of India Project

For this encylopaedia a file of references has been prepared over a number of years. It has at present over 2,00,000 references which are filed under subject headings (about 4000) which the encyclopaedia uses i.e. botanical names for plants and under common names for animals, minerals and industries. Corresponding files of information (ledgers) have also been built with necessary photocopies, reprints etc. (4000 files). Currently it is screening about 800 periodicals and serials. It also screens about 40 abstracting periodicals. About 20,000 references are added each year.

1.62 Indian Agricultural Research Institute Library

Indian Agriculture Reference Media, a retrieval of information file, with about 30,000 subjects cards has been built up from 1944 onwards. Information has been filed as per author and subjects using the U.D.C. scheme of classification. Aspect cards are prepared and filed according to classification adopted. All cards are filed according to U.D.C. About 650 Indian and foreign periodicals received in the library are screened to locate contributions by Indians on Indian agriculture, about 6500 subject cards are added annually at present.

1.63 IVRI File

At the Indian Veterinary Research Institute at Mukteshwar a retrieval of information file has been built from 1905 (?) till 1947. Various important journals have been indexed and cards kept according to subjects. Over 30,000 to 40,000 references have been collected and kept in this file. It is a very valuable source media for veterinary sciences in India. This activity however, has been discontinued since 1947.

1.64 Retrieval of Information Files on Fishes at the Fisheries Division of F.A.O.

A retrieval of Information file has been built up on fisheries by the Biology branch of Fisheries Division of F.A.O.

The file of reference built up so far has more than 200,000 references on fishes from the year 1800 onwards.

TABLE - 2

RETROSPECTIVE AND CURRENT ITEMS MONITERED BY SOME OF THE ENGLISH LANGUAGE ABSTRACTING AND BIBLIOGRAPHICAL PERIODICALS

	Retrospective		Current	
Title	Years	No. of items	No. of items in 1972	No. of serials covered
General				
Biological Abstracts	1929-71)	25, 80, 000	1, 40, 000)	7600
Bioresearch Titles	1965-71)		0, 80, 000)	
Bibliography of Agriculture	1944-71	24, 86, 920	1, 28, 965	9000 to 10, 000
Tropical Abstracts	1953-71	58, 651	3, 065	1500
Plant Sciences				
Plant Breeding Abstracts	1930-71	1, 49, 327	9, 501	2135
Horticultural Abstracts	1931-71	1, 63, 130	10, 150	1204
Field Crops Abstracts	1948-71	53, 993	6, 553	1205
Herbage Abstracts	1938-71	63, 581	3, 200	
Genetics Abstracts	1969-71	24, 629	15, 590	3200
Soil & Fertilizer				
Soils & Fertiliser Abstracts	1948-71	76, 581	5, 597	1720
Microbiology Abstract A	1963-71	42, 854	11, 552	3000
-do- B	1966-71	39, 749	11, 373	3200
Plant Protection				
Review of Applied Entomology A	1913-71	86, 211	5, 094)	1400
-do- B	1913-71	34, 895	2, 330)	
Entomology Abstracts	-	-	8, 800	3200
Review of Plant Pathology (Formerly Review of applied mycology)	1922-71	1, 05, 662	4, 360	950
Abstracts of Mycology	1967-71	50, 000	10, 000	1200
Virology Abstract	1967-71	16, 546	6, 421	3200
Weed Abstract	1957-71	33, 931	3, 050	568
Pesticides Doc. Bulletins	1966-69	96, 960	-	-
Helminthological Abstracts	1932-71	66, 986	6, 200(E)	3000
Nutrition & Food				
Nutrition Abstracts and Reviews	1932-71	2, 34, 346	8, 950	1060
Food Science Abstracts	1949-57	23, 069	Discontinued	213
Food Technology Abstracts	1969-71	36, 000	12, 000	1000
Economics, Sociology, etc.				
World Agric. Economics & Rural Sociology Abstracts	1959-71	44, 640	5, 682	1076 (A)
Bibliography of Agricultural Economics	1951-70	11, 039	DNA	-91
Tobacco Abstracts	1958-71	37, 956	2, 811	Not available

TABLE - 3

INFORMATION ON INDIVIDUAL CROPS

Subject	Source	Years	No. of items
Wheat	Wheat Bibliography Wheat Abstracts	1959-68 1963-65	22, 315 15, 037
Rice	Rice Bibliography	1951-71	37, 000
Millet	Millet Bibliography	1930-63	01, 224
Sorghum	Sorgham Bibliography	1930-63	02, 094
Corn	Corn Bibliography	1959-68	20, 462
Tobacco	Tobacco Abstracts	1938-48	10, 990
Cotton (Indian)	Bibliography of Indian cotton	upto 1955	01, 394
Mango	Mango Bibliography	upto 1950	01, 300
Rubes of Ribes	CAB Bibliography	upto 1969	02, 447
Malus of Pyrus	-do-	upto 1960	02, 318
Prunus	-do-	upto 1965	02, 921
Indian Entomology	Bibliography on Indian Entomology	1952-61	04, 417
Nematodes	FAO Bibliography [card form]	--	27, 000
Fishes	FAO File	from 1800 upto date	over 200, 000

For this about 1500 periodicals, serials and numerous other publications received at the FAO Library as well as some received by the Fisheries Division are screened by the specialists of Biology Branch. Currently the FAO is publishing Aquatic Sciences Abstracts having 12, 000 items each year.

1.65 *Royal Tropical Institute (Amsterdam)*

The Institute is at present publishing the 'Tropical Abstracts'. They have very systematically built up a file of information on various tropical crops, products, etc. At present they have about 300, 000 cards in the file. Out of these about 50, 000 are in English and the rest in Dutch. All subject cards are filed by U. D. C.

About 1200 currently received periodicals and serials are screened very regularly by the Documentation Section and new references are added at the rate of about 5000 references per year. Abstracts are prepared by specialists, who screen. Many of them have subject background as well as some experience in tropics of actual field work.

1.66 *Tropical Products Institute (London)*

A retrieval of information file of about 5, 00, 000 references has been built over a number of years on plant products.

About 1000 periodicals and about 800 serials are regularly screened by various staff of the Institute. Cards are prepared in the documentation section. A number of aspect cards are prepared. Filing of these cards is done under various subject headings which is a mix-up of common names, uses, and even systematic names of plants.

A special index has been built up to guide the reader to know under which appropriate heading the information will be found.

1.67 *Commonwealth Bureau of Soils and Fertilisers*

This Bureau is located at Rothamstead Experiment Station since 1929. The Bureau has been publishing the 'Soils and Fertilisers' Abstracts.

A retrieval of information file comprising of 4,50,000 subject cards on soils and fertilisers has also been built by this Bureau, comprising about 150,000 references.

A staff of 5 to 6 specialists screen the periodicals and serial literature received at the Rothamstead Library and prepare abstracts as well as various aspect cards. Some abstracting periodicals are also screened. Cards are filed as per the U.D.C. classification scheme.

A number of inquiries for bibliographies are answered from the file. These will be computerised as soon as all the C.A.B. services get computerised.

1.68 *Nutrition Abstract and Reviews*

Mechanisation for retrieval of Information

Work on the classification of information in Nutrition Abstracts by coding them for punched cards is being done. By the end of 1965 a total of 80,123 abstracts have been coded and there are 54063 punched cards in the file. However, by May, 1966 it is expected that coding for vols. 21 to 35 will be completed. There will be about 95,000 punched cards to provide the retrieval of information in this area. (C.A.B. annual report, 137, :7, 1965-66). Now probably all information is available on tapes.

1.69 *Chemical Abstracts (Columbus, Ohio)*

The CA is keeping up with the rising tide of chemical knowledge. It is publishing at present about 340,000 abstracts a year by screening about 14,000 periodicals and serials and about 50 abstracting and bibliographical periodicals to inform about current chemical information. It has put on magnetic tapes the vast accumulated data of chemical information as Chemical Condensates from 1967 which are available for machine searching.

1.7 *Some important information monitoring agencies*

There are numerous subject or mission oriented, or national information monitoring agencies in the world today. It is not possible to survey all of these here. We are giving below information about a few of them.

1.71 *U.S.A.*

In U.S.A. the approach to information monitoring is decentralised. Various set-ups like the Chemical Abstracts, Biological Abstracts etc. exist. The National Agricultural Library compiles the Bibliography of Agriculture and the Medical Library complex publishes the Index Medicus. The A.E.C. publishes the Nuclear Science Abstracts. Various Committees have surveyed the national information activity in science and technology. Data on the coverage of Biological Abstracts and Bibliography of Agriculture have been given elsewhere in this paper.

1.72 *U.S.S.R.*

In U.S.S.R. the information processing is centralised to a great extent. The Institute of Scientific Information of Academy of Sciences of U.S.S.R. was contemplated in 1952 and was converted in to 'All Union Institute of Scientific and Technical Information in 1956 (VINITI). It at present publishes the Referativnyi Zhurnal in 25 series and in 33 parts, monitoring over a million items of information.

In addition VINIMI publishes the Medical Abstracts Journal, in 13 different series, CINIS on building and architecture.

The all union Institute of Scientific & Technical Information in Agriculture VINTISH (1965) is responsible for Information in Agriculture. This is currently offering abstracts cards in some 43 subjects in agriculture which is replaced by a Referativnyi Zhurnal in agriculture from 1969. In addition they have an Express Information Service.

The Central Library of the Ministry of Agriculture publishes a 'Monthly Index of Agricultural Literature' of the USSR listing over 60,000 titles in a year. In addition a bibliography of foreign agricultural literature is also published listing over 30,000 entries.

1.73 *France*

Centre National de la Researche Scientifique (CNRS) was started in 1939. They publish the 'Bulletin Signaletique' in seventeen parts. In addition six others in human sciences. It now includes over 500,000 references per year.

1.74 *Commonwealth Agricultural Bureaux*

The abstract journals form one part of the range of services in agricultural sciences provided by the CAB and provide a total of well over 100,000 abstracts and citations each year. They constitute one of the comprehensive coverage in English of the world literature on agriculture and related sciences. The CAB is subsidised by the contributing countries. From 1973 the abstracting journals are being produced by computer techniques and a consolidated data base is being created from which new services will be developed. Most journals are being issued monthly. In due course all data will be available on magnetic tapes.

The CAB currently publishes 19 abstracting journals in various agrobiological subjects. Retrospective coverage given by CAB journals has been listed at Table 2 (page 35).

1.8 *Agricultural Libraries*

Libraries form one of the most important organisation for acquisition, organisation and dissemination of information to users. The role of various special libraries devoted to various subject areas is still more remarkable as they have played important role in active assistance to the scientific community. In agrobiological subjects some of the existing major libraries are: [Agris Survey].

- Tsentral'naya Nauchaaya Sel 'skokhozyaistvennaya Biblioteka (VASKHNIL), Moscow, 3 million volumes.
- National Agricultural Library (NAL) Washington, 1.5 million volumes + 23,000 periodicals
- Vatav Vedeckotechnickych Informaci CSAZ (UVTI), Prague, 780,000 volumes.
- FAO Library, Rome. About 600,000 vols, 5000 current serials.
- Central Library of the Agricultural University, Wageningen, Netherlands. 400,000 volumes + 10,000 periodicals.
- Indian Agricultural Research Institute Library 2,50,000 vols, 6500 files of serials, 4500 current serials.

1.9 *Output in non-English Languages*

An analysis of English language abstracting periodicals like Chemical Abstracts etc. was done. Their coverage of information indicates that roughly half the world's literature on science and technology is published in English, much more than in any other single language. The fact remains however, that half the world's scientific literature is not in English and hence presents language difficulties to scientists using English. Agricultural scientists need appropriate translation facilities. Except INSDOC, in our country, facilities of translation with various complexes like ICAR, ICMR, etc. needs augmentation. Over 200 important journals in Russian languages today are published as cover to cover translations. The agricultural libraries will have to procure many of these for the scientific community they serve.

2 *Data on Indian Output*

Having surveyed the world output of Agricultural information some information about the output of books, monographs, serials, theses, scientific papers etc. published in India is given in succeeding paragraphs.

2.1 *Output of Books and Monographs*

A complete retrospective bibliography of publications of interest in the Agrobiological subjects in India is not available. Information gathered from a few sources give some data about it.

a) CSIR: Indian Scientific & Technical Publications Exhibition, Bibliography 1960 b) CSIR: Indian Scientific & Technical Publication Bibliography (1960-65)	English Books = 1200 Indian Languages = 534
c) Books in Print Indian (1973)	1357
d) Bibliography of ICAR Publications	947

2.2 *Serials Published*

A list of Indian serials of interest for the agricultural subjects was compiled by us for the AGRIS in April, 1972. It has listed over 649 serials published in India in English language. This list includes 263 periodicals and journals, 56 bulletins and series publications, 185 annual reports, 61 statistical data magazines, 14 abstracts and digest periodicals, and 9 directories. A subject wise breakdown of these is given below:

General Science 27
Chemical Technology 13
Agriculture 330
Forestry 19
Econs. & Agric Econs. 31
Geography 4
Chemistry 11
Biology 11
Irrigation & Power 23
Zoology 17
Sociology 18
Agric. Engng 5
Geology 11
Animal Husbandry 52
Statistics 51
Botany 20
Medicine 12

2.3 *Data on Theses*

Various agricultural universities have published bibliographies of the theses submitted at their universities or theses available in their libraries. We are giving in the next column some of the information collected from these bibliographies.

Table - 4
Data on Theses

Sl. No.	Source	Year	Nos.
1	ICAR	Upto 1974	914
2	IARI	1938-69	2078
3	Kalyani University Agric. Faculty	1969-72	264
4	Orissa University of Agriculture & Technology		
	a) Agronomy	1962-72	283
	b) Animal husbandary	1970-72	20
5	Univ. of Agriculture & Science, Bangalore	1968-72	108
6	IVRI	Upto 1969	361
7	U. P. Agricultural Univ.	Upto 1970	278
8	University of Udaipur	Upto 1968	285
9	Punjab Rao Krishi Vidyapeeth (Akola)	1969-71	155
10	Haryana Agricuitural Univ.	Upto 1973	1104

2.4 *Output of Scientific Papers*

INSDOC is currently monitoring output of Indian science literature and publishing them as 'Indian Science Abstracts'. Currently it lists about 13,000 papers. Some data about Indian output of scientific literature covered in this and other sources is given at the bottom of the page.

2.41 *Other Abstracting Periodicals*

In addition to the abstracting periodical listed at 2.4 above various abstracting periodicals are published in India, which cover Indian as well as foreign periodicals and which are of interest to agricultural scientists. Brief information of some of these serials is given in Table 5 (page 40).

		Year	No. of items	Year	No. of items
1.	Indian Science Abstracts	1965-70	58373	1972	13404
2.	Indian Horticultural Abstracts	1951-58	3667	Publication ceased	
3.	Bibliography of Indian Agriculture (Plant Sciences)	1962-71	27696	1972	4500

TABLE - 5

ABSTRACTING AND BIBLIOGRAPHICAL PERIODICALS

Sl. No.	Title	Sponsor	Year	Total No. of Absts.
1.	Advance Abstracts of contributions of Fisheries and Aquatic Sciences in India	Central Marine Fisheries Research Institute, Mandappam	1970	458
2.	Community Developments and Panchyati Raj Absts.	National Institute of Community Development, Hyderabad	1967	120
3.	Defood Absts.	Indian Defence Food Research Laboratory	1970	425
4.	FAI Abstract	Fertiliser Association of India, New Delhi	1972	671
5.	ICSSR Research Abstract	Indian Council of Social Science Research, New Delhi		Review articles
6.	Indian Behavioural science Absts.	Behavioural science centre.	1972	600
7.	Irrigation & Power Abstracts	Central Board of Irrigation & Power, New Delhi	1972	3500(E)

2.5 *Projects of Research*

Various projects of research carried by research institutes get listed in their annual reports etc. Very few reports, however, are upto-date. Recently INSDOC has compiled and published 'Current Project of Research in CSIR Laboratories - 1972. This lists covers 2000 current project of research in 39 organisation under CSIR, INSDOC has also been compiling similar information about the projects of research in science and technology subjects for Indian Universities including agricultural universities. They have yet to bring out this publication. However, it is likely that they may be listing over 10,000 projects of research. The ICAR has the research Project Unit which compiles and keeps profile of projects of research in the ICAR system and various agricultural universities. About 5400 projects of research have been listed by this unit.

If similar information is compiled and published by the various agencies like the Atomic Energy Commission and similar other public and private sector R & D organisations, it will be a great asset for the scientific community in our country. They will be able to avoid duplication of research and establish contacts with scientists working in their areas of interest.

2.6 *Comprehensive Monographs, etc.*

To provide comprehensive information to agricultural scientists ICAR has published numerous monographs. There are excellent source media to scientists. Some of the titles, it has covered, include 'Cotton in India, Pulse Crops in India, Rye, Neam, Jute in India, Potato in India, Indian tobacco, the Mango a hand book, Grass cover of India, Rose in India etc.

The CSIR has been publishing the "Wealth of India" an encyclopaedia of India's raw materials and industrial products. The Raw Materials series cover all economic plants of India, in a dictionary order as per genera and species. So far they have published volumes covering A to Re: Some of the other monographs published by CSIR cover topics like Gnetum, Marsilea, Acquatic angiosperms, Cedrus, Proteaceae, Pinus, Thycanosptera etc. which are of interest to agricultural scientists.

2.7 *Indian Directories, Yearbooks*

Directories, yearbooks and handbooks are currently being published in India which are useful source of information to scientists and technicians etc. Information about some of the important of these is given in Appendix D.

2.8 *Statistical Data*

This needs no elaboration for agricultural research workers. The Directorate of Agriculture, Economics and Statistics is publishing numerous data periodicals and compilations. Similar data periodicals are also being compiled and published by various State Departments of agriculture. Two publications survey these data publications in a very comprehensive manner, they are:

1. Bansil, P. C.: Agricultural statistics in India. Dhanpat Rai & Sons, Jullundar, 1970.
2. Ministry of Food and Agriculture, Directorate of Economics and Statistics:
   Guide to current agricultural statistics.

   Directorate of Economics & Statistics, 1954.

The Directorate of Marketing and Inspection is publishing various reports and bulletins on different agricultural commodities. These marketing series forms excellent source material on subjects they cover.

3. *Information Facilities for Indian Agricultural Scientists*

As per Technical Manpower of CSIR, there were over 73,700 personnel, in April, 1971 who had a minimum degree in agriculture or veterinary sciences. Out of these 10,860 personnel were working in various research organisations.

Agriculture	% in Research	Estimate stock	Estimated Nos. in Research
Doctorates Agriculture	39.30	13,500	5,373
Graduates	8.23	47,200	3,885
Veternary Degree	12.32	13,000	1,602

The number must have increased by now. Further, it is obvious that those who are not working in research, are working in various development and other related activities in Central & State Govt. departments of agriculture, public and private sector undertakings etc. In addition to these there are a number of persons in other desciplines, who are working in agrobiological subject areas. All of them must have access to information of their choice for fulfilling their objectives.

3.1 *Agricultural Research and Education Complex in India*

Currently we have the ICAR with its 24 research institutes including IARI, IVRI, NDRI, etc. There are 19 agricultural universities in various states and over 85 agricultural and veterinary colleges. Various institutes and universities etc. have their substations and farms. We have an International Institute for Semi Arid Tropics Research. Various State department of Agriculture have also scientific and technical personnel working in development and related activity.

In addition to this we have huge complexes of the Govt. of India, like the Fertiliser Corporation, Food Corporation, National Seed Corporation and similar other corporations. There are other similar complexes in private sector also. There is also Extension Directorate, Directorate of Marketing and Inspection etc. Scientists, technicians, administrators and students distributed in these organisation must have access to the scientific information for their research, teaching and other related needs.

3.11 Libraries in ICAR Institutes and Agricultural Universities

Various agricultural universities, ICAR Institutes, state departments of agriculture, agricultural and veterinary colleges have their libraries. These libraries have collections of different sizes and offer services to their clientele. Two survey teams appointed by ICAR, have collected statistics and data on libraries of ICAR, agricultural universities and many of the agricultural colleges. Some of the available information is given in Appendix A. The ICAR libraries have over 600,000 volumes with them, the Agricultural University libraries have a collection nearing 80,00,000 volumes. This however, does not include data pertaining to holdings of libraries attached to 95 agricultural and veterinary colleges. Catalogues prepared at these colleges, university and institute libraries form a very valuable information source for agricultural scientists in the country. Diverse systems of cataloguing and classification are followed by these libraries.

3.12 Other Libraries of Agriculture

In addition to the data given in Appendix A there are many collections painstakingly built over a number of years in some of the colleges in agriculture and veterinary science, like the Kanpur Agriculture College (Now an Institute) Poona Agriculture College, etc. Details of information of the nature of collection, holdings facilities for reprography etc. about these are not available. We have 85 colleges in our country devoted to these subjects.

The Ministry of Food & Agriculture has also many other libraries under it like that of the Directorate of Marketing and Inspection, Directorate of Agricultural Economics & Statistics, Directorate of Extension, Films Library etc. Details of these are also not available.

Various State Departments of Agriculture have also good library collection. Some of the institutes like the Tocklai Tea Institute, Central Coffee Board etc. also have very well organised important collections, which have not been surveyed so far.

Various corporations like Food Corporation, Fertiliser Corporation, National Seeds Corporation etc. have also library facilities which have not been surveyed.

3.2 Libraries of Other Complexes

To assist Indian agricultural scientists for their literature search, in addition to agricultural libraries described earlier, there are libraries in other complexes also. The CSIR with its numerous laboratories has good special libraries built over a number of years. The Indian Council of Medical Research has also libraries attached with its laboratories. Various Commissions like the Atomic Energy Commission, Oil and Natural Gas Commission, Central Water & Power Commission, etc. have very good libraries like the National Medical Library, the BARC Library, the Water Power Commission Library etc. Surveys like the Geological Survey of India, Botanical Survey of India, Zoological Survey of India have also very good libraries. The Indian Standards Institute, Patents Office, Indian Institute of Science, Indian Statistical Institute have also excellent libraries devoted to the subject areas they specialise. Details of holdings of these libraries are not available except a survey conducted by the C.S.I.R.

3.21 C.S.I.R. Survey

As is well known the C.S.I.R. has institutes of research which have very good libraries on specialised topics of interest to the Institute. The C.S.I.R. research complex also has cooperative research associations supported by it. As mentioned earlier various other disciplines, pure as well as applied are linked with agriculture. Therefore, amongst the collections of special libraries of C.S.I.R. there are holdings or parts of holdings which are of interest to agricultural scientists. For example the collection of National Botanical Gardens and the Central Indian Medicinal Plants Organisation, which are botanical in nature, are of interest to agricultural scientists. In addition the collections of National Chemical Laboratory and National Physical Laboratory etc. are also of interest. A Survey of the CSIR libraries was done in 1969 by Shri T.S. Rajagopalan and Shri K. Ramaswami. The libraries of C.S.I.R. form an important source of information in the country in the particular subject covered by them. It has been estimated that all the C.S.I.R. libraries taken together hold a stock of 5,29,238 vols. In addition the co-operative research associations hold a stock of 42,459 vols. A good number of periodicals are also being received by these libraries.

3.22 Other Collections of Academic Institutes

In addition we have university and college libraries which are important information source media to scientists. We have in our country 82 universities, including agricultural universities, we also have 9 institutes which are deemed as universities. There are 3398 colleges in the country out of which 2488 colleges are arts, science and commerce, and 910 professional colleges, out of these there are 103 medical colleges, 115 engineering colleges and 85 colleges in agriculture and veterinary sciences.

Data pertaining to agricultural universities has been given in Appendix B.

3.3 International Research Institutes

At present there are six international agricultural research institutes established in various parts of the world. These are devoted to various crops or topics like rice, maize, wheat, semiarid tropics etc. They have built up excellent collections in the subject area they are specializing. Some of them are publishing very good bibliographies like the one on rice. One of these is being set up in India, ICRISAT (International Crop Research Institute for Semi Arid Tropics) at Hyderabad. These institutes, listed below, are very important centers for agricultural information.

Centre	Topics
1. IRRI (International Rice Research Institute) Losbanos, Philippines	1960. Rice & Farming systems for rice.
2. CIMMYT (International Maize & Wheat Improvement Centre (Mexico)	1966. Maize, Wheat, Barley, Rye, Triticale.
3. IITA (International Institute for Tropical Agriculture) Ibadan, Nigeria	1967. Farming systems for lowland humid tropics including work on maize, Rice Tenders, Food & Legumes.
4. CIAT (International Centre for Tropical Agriculture), California, Colombia	1968. Farming systems for the tropics with emphasis on Beef, Swine, Maize, Rice, Beans, Cassavee.
5. IPC (International Potato Centre) Peru	1972. Potatoes.
6. ICRISAT (International Crops Research Institute for the Semi Arid Tropics) India	1972. Sorghum, Millets food legumes & farming systems for semi tropics.

3.4 Scientific Serials Available

The World List of Scientific Periodicals has listed over 60,000 scientific serials. Recently the National Lending Library of U.K. has been procuring over 36,000 scientific serials published in the world. We do not have any single library currently procuring all these serials in our country. INSDOC has been preparing Union Catalogue of scientific serials holdings of various libraries in our country. As per information available they have been able to locate 25,000 serials in various libraries they have covered so far. Directory published by IAALD lists over 13,000 Agricultural serials. Since, currently no union catalogue of agricultural serials is being compiled in India, we cannot say as to how many of these titles are available in our country. Serial catalogues published by some of the agricultural university libraries and INSDOC are given in Appendix C. Majority of serials acquired by agricultural university libraries are of interest to agricultural scientists. We, however, observe that amongst the 12 catalogues of serials published by INSDOC each one has titles of interest to agricultural scientists. The percentage varies from 10 to 20%, details are at given at Appendix C.

3.41 Other Important Serials Lists

In Table 2 we have given data about the serial titles covered by abstracting periodicals

TABLE - 7

SERIALS LISTS

Sl. No.	Some important serials lists	Year	Titles
1.	World List of Scientific Periodicals (Retrospective)	1900-60	59961
2.	Current Agriculture Serials (Excluding Forestry and Fisheries) IAALD	1965	12427
3.	Current Serials Received by National Lending Library U. K.	March 1967	over 26000
4.	BIOSIS: List of Serials Bioscience Information Centre	1971	9477
5.	Directory of Indian Scientific Periodicals (INSDOC)	1964	725
6.	Library of Congress Accession List, India. Cumulative List of Serials	1971	7500
7.	ULRICH'S International periodicals Directory	1969-70 13th Feb.	40000
8.	Access: Key to source literature chemical series supplements 1-3 (Chemical Abstract)	1969	30798 cont. 10399 849:329 1033:324 1280:271

listed therein. These lists have been published in these abstracting periodicals. In addition the following information about some of the serial lists given below may be of interest to agricultural scientists.

3.5 *Some Directories of Scientific Institutes and Personnel*

There are numerous directories published in the world, today, which are of interest to agricultural research workers. To list all of them will be a difficult task. We have already listed a few directories at 2.7 which are of interest, in addition a few directories of Institutes and personnel are given in Appendix E, which will be of use to agricultural research workers.

3.6 *Reprography Facilities*

Facilities for giving copies of documents by using various techniques like microfilm photocopy, Xerox etc. are available in our country. Some centres of which information is available are listed below:

Indian National Scientific Documentation Centre with its substation at Bangalore. They provide copies by borrowing publications from other libraries also.

Following centres give copies of documents from their collections.

a) Punjab Agricultural University, Ludhiana.

b) Indian Agricultural Research Institute Library, New Delhi.

c) Bhaba Atomic Research Centre, Bombay.

d) Orissa University of Agricultural Sciences and Technology, Bhuvaneshwar.

Agricultural scientists can take advantage of this facility.

3.7 Role of ICAR

The ICAR has been playing a very vital role in developing libraries in agricultural research and education in India.

It is naturally supporting all the libraries of all the ICAR Institutes. Further, it is also giving grants for the developments of agricultural University libraries by giving ad-hoc grants for library buildings and a sum of 2 lakhs for the procurement of publications each year. It has already appointed, to survey the library system, two survey teams. Report of the second survey team is being finalised.

These survey teams have made various recommendations for the improvement of the library and information system. The most important recommendations, that have been accepted by ICAR, which will improve the ICAR and agricultural university libraries are:-

a) Spending of 6% of the budget on the library of the institute or university.

b) University Grants Commission norms for staffing of the library and their qualifications and pay scales.

ICAR has accepted to establish a cell at the headquarters to implement the various recommendations.

3.8 Workshops, AALDI, IAALD

So far three workshops have been held at the Agricultural University at Pant Nagar, Punjab Agricultural University at Ludhiana and at Jabalpur. In these various groups working in agricultural libraries, reprography services and information have participated. The one at Ludhiana was held on reprography services. Others discussed about agricultural information, libraries, their organisation etc. The ICAR has been supporting the workshop activities by giving grants for them. The agricultural universities have also spent quite some amount to organise these workshops.

AALDI

An Association of Agricultural Librarians and Documentalists of India was established in 1971. It today has a membership of over 100 persons. It is trying to bring the agricultural librarians together to discuss common problems of agricultural information. It is publishing the 'AALDI Bulletin'.

IAALD

International Association of Agricultural Libraries and Documentalists has been functioning from 1955. It has held various international conferences for discussing various matters of common interest. It has been a very active organisation and has been responsible for establishing the AGRIS and AGLINET. The 'Quarterly Bulletin of IAALD' publishes informative articles on libraries. It has published the 'Current Agricultural Serials' listing over 13000 titles in agriculture, and also lists important bibliographies in the Bulletin.

3.91 Information Search Courses for Scientists

Since agricultural information is published now-a-days in diverse places and different techniques have been employed in compilation of various tools of literature search some orientation of the research and technical personnel working in this area is perhaps necessary. This is more so, for students like M.Sc. and Ph.D. who are newly entering the field.

At present at National Dairy Research Institute, Karnal and at IARI one or two credit courses are offered for M.Sc. and Ph.D. students in literature search, editing etc.

However, looking at the current trends it looks this type of one or two credit course is necessary as a compulsory subject at all agricultural universities for M.Sc. and Ph.D. students.

3.92 *How to get best out of the existing conditions*

Our libraries are comparatively smaller, we do not have libraries having million volumes like the National Agricultural Library, Washington and many of our agricultural university libraries are at the starting stage. Resources required for building a large library collection are formidable. Internal network in some form, therefore, is necessary if the available collections are to go a long way in meeting the demands of our agricultural scientists and technical personnel.

3.93 *Centralised Monitoring*

Information given indicates that centralised monitoring and publishing of information pertaining to the following areas are essential.

a) Serials available in various agricultural libraries.

b) Theses available in various agricultural libraries.

c) Projects of research currently persued.

d) Bibliography of Indian agriculture in plant sciences, animal husbandry and veterinary sciences.

4. *Some Thoughts on Future Development*

We have to take into consideration some of the recent changes that are taking place in the information field at the international levels. The current developments are pertaining to (a) Use of machine methods including computers in processing, retrieval and dissemination of information (b) S.D.I. (c) The network concept (d) N.C.S.T. conference.

4.1 *Use of Computors*

Various abstracting and indexing services throughout the world are currently producing computer tapes for information retrieval which are also available to others. Today over 200 tape services are available including major services like Chemical Abstracts, Bibliography of Agriculture, Index Medicus etc. The CAB has also put their abstracting services on computer tapes from 1973. The available tape services, are not uniform and require different hardware as well as software. We will have to establish a tape search centre in agro-biological subjects in our country for serving the scientists.

4.2 *Selective Dissemination of Information (SDI)*

This is basically a computer based operation in which a profile of subject interest of the user is created and kept in machine readable form. As and when new information is processed by the computer the individual user is kept informed by the computers of the new references of his interest. If we make tape search facilities available, we can also organise such personalised services for agricultural scientist.

4.3 *Current Awareness Service*

To keep scientists informed about latest information appearing in important scientific journals and serials various current awareness services have been started by various information monitoring agencies. Some of these which are of interest to agricultural scientists are:-

Chemical Titles, Chemical Abstracts Service, U.S.A.

Current Contents, series (i) Life Sciences, and (ii) Agriculture, Food and Veterinary Sciences. Institute for Scientific Information, U.S.A.

These services are useful for ordering reprints etc.

Various libraries circulate contents lists of important journals. This is done to inform the clientele, the information of their interest received in the library. However, there is a time lag in these publications which cannot be avoided as journals are received by sea mail.

4.4 *The Network Concept*

To make information easily available to scientific community in the world UNESCO has sponsored the UNISIST Programme. It is trying to establish various networks of information centres in the world. They are also making efforts to have uniformity of practices adopted by the information processing agencies.

AGRIS sponsored by FAO is establishing similar network for agrobiological subject area. The first experimental issue of AGRIS entitled 'Agrindex' has already been published, which has listed 6,659 entries and has also given index of 3500 corporate entries, which includes various organisations in agriculture in the world.

The FAO has sponsored an Agricultural Libraries Network (AGLINET) in the world by linking over 15 to 16 major agricultural libraries in the world. It has requested IARI Library to be the AGLINET Centre in this country.

4.5 The NCST Conference on Science Information

Recently the National Committee for Science & Technology held a conference to discuss about a National Information System in Science and Technology in India, NISSAT. The NISSAT would be based on existing information facilities. It would develop an integrated national system by making full use of the information potential of the country by co-ordinating the activities of the individual information centres according to well defined guide lines and division of responsibilities. Major science information agencies in the federal sectors, existing as well as proposed, will be incorporated in this system.

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APPENDIX - A

LIBRARIES OF ICAR INSTITUTE'S HOLDINGS & CURRENT SERIALS

Sl. No.	Name	Holdings	Current serials
1.	Indian Agricultural Research Institute, New Delhi	225000	4150
2.	Central Arid Zone, Research Institute, Jodhpur	15099	480
3.	Cotton Technological Research Laboratory Matunga (Bombay)	11139	163
4.	Indian Grassland & Fodder Research Institute (Jhansi)	4500	15
5.	Indian Institute of Horticultural Research (Bangalore)	5870	125
6.	Jute Technological Research Laboratory, Calcutta	12611	135
7.	Jute Agricultural Research Institute, Barrackpore (West Bengal)	8684	191
8.	Indian Lac. Research Institute, Ranchi	15711	177
9.	Central Plantations Crops Research Institute, Kasargod (Kerala)	5674	192
10.	Central Potato Research Institute, Simla	7000	239
11.	Central Rice Research Institute, Cuttack	15096	450
12.	Indian Institute of Sugarcane Research, Lucknow	27000	200
13.	Sugarcane Breeding-Institute, Coimbatore	2500	135
14.	Central Tobacco Research Institute, Jajahmundary	14328	261
15.	Central Tuber Crop Research Institute, Trivandrum	1028	116
16.	Indian Veterinary Research Institute, Izatnagar, Mukteswar	86000	1000
17.	National Dairy Research Institute, Karnal	44357	445
18.	Central Inland Fisheries Research Institute, Barrackpore	10073	270

Continued

1	2	3	4
19.	Central Marine Fisheries Research Institute	13000	300
20.	Central Institute of Fisheries Technology, Ernakulam	2108	95
21.	Central Sheep & Wool Research Institute, Malpur (Rajasthan)	10000	
22.	Institute of Agricultural Research Statistics Library Avenue, New Delhi	15000	170
23.	ICAR Library, Delhi	70000	523

APPENDIX - B

LIBRARIES OF AGRICULTURAL UNIVERSITIES HOLDINGS

Sl. No. 1	Name 2	Holdings 3	Current serials 4
1.	Andhra Pradesh Agriculture University, Hyderabad	9458	95
2.	Assam Agricultural University, Jorhat	18086	242
3.	G. B. Pant University of Agriculture & Technology (Pantnagar) U. P.	123028	1384
4.	Gujarat Agricultural University (Ahmedabad)	DNA	DNA
5.	Haryana Agricultural University (Hissar)	58938	1343
6.	Himachal Pradesh Agriculture University (Palampur)	10073	DNA
	Himachal Pradesh Agriculture University (Simla)	10556	303
7.	J. M. K. V. V. Jabalpur	39121	695
8.	Kerala Agricultural University Distt. Trichur	10242	189
9.	Mahatma Phule Krishi Vidyapeeth Rahuri (Maharashtra)	DNA	450
10.	Konkan Krishi Vidyapeeth, Dapoli (Maharashtra)	6229	129
11.	Marathwada Krisni Vidyapeeth, Parbhani (Maharashtra)	14259	302

Continued

1	2	3	4
12.	Orissa University of Agriculture & Technology, Bhubaneshwar (Orissa)	95653	575
13.	Punjab Agricultural University, Ludhiana	112974	2007
14.	Punjab Rao Krishi Vidyapeeth, Akola (Maharashtra)	37315	600
15.	Rajendra Agricultural University (Bihar)		
	R.V.C. (Ranchi Veterinary College)	4008	95
	R.A.C. (-do-)	15365	107
	B.A.C. (-do-)	12460	83
16.	Tamil Nadu Agricultural University Coimbatore (Tamil Nadu)	72000	639
17.	University of Kalyani, Nadia (West Bengal)	29968	783
18.	University of Agriculture Sciences Hebbal, Bangalore	48104	959
19.	University of Udaipur, Udaipur (Rajasthan)	54472	414

APPENDIX - C

CATALOGUES OF SERIALS IN AGRICULTURAL LIBRARIES

Sl. No.	Title	Year	No. of serials
1.	Catalogue serials in the HRUL, Palampur	1971	230
2.	Catalogue serials in the PAU, Ludhiana	1970	1300
3.	Index Catalogue periodicals in the HAUL, Hissar	1971	1343
4.	Catalogue serials in the UAS, Bangalore	1968	779
5.	Catalogue serials in the UAS, Bangalore	1972	1129
6.	Catalogue of periodicals and serials UPAU	1970	1225
7.	University of Kalyani Faculty of Agric. Library, List of current serials	1973	444
8.	Catalogue of periodicals in NDRI, Karnal	1968	492
9.	Union Catalogue of Tech. Periodical in Indian Veterinary College Library (Prepared by JNKV Library, Jabalpur) 16 colleges	1966	617

Continued

1	2	3	4	5
10.	Panjab Krishi Vidyapeeth, Akola		1971	376
11.	Catalogue of serials in the IARI Library		1967	5448
	Serials Listed in INSDOC Catalogues	Year	Agrobiological serials	No. of serials
12.	Catalogue serial National Science Library, Delhi	1965	411	3447
13.	Catalogue serial Indian Institute of Science Library, Bangalore	1966	472	3260
14.	Catalogue serial Indian statistical Institute, Calcutta	1966	238	2990
15.	Catalogue serial National Institute of Sciences in India, New Delhi	1968	570	1946
16.	Regional Union Catalogues of Scientific serials, Bangalore	1967	916	3249
17.	Regional Union Catalogue of Delhi Medical Libraries	1967	370	3080
18.	Regional Union Catalogue of Varanasi	1968	431	2643
19.	Regional Union Catalogue of Mysore State	1968	704	2623
20.	Regional Union Catalogue of Kerala	1969	605	2122
21.	Regional Union Catalogue of Bombay Poona	1973	-	8082
22.	Union Catalogue of Scientific serials in Geological Survey of India	1969	-	4033
23.	Union Catalogue of Scientific serials in Geological Survey of India, Dehra Dun, Roorkee	1971	350	3057

APPENDIX - D

INDIAN DIRECTORIES, YEARBOOKS, HANDBOOKS

Sl. No.	Title	Sponsor	Year	Place
1	2	3	4	5
1.	Agricultural Yearbook New Vistas in crop yields	I.C.A.R.	1970	New Delhi
2.	Assocham Farm Input Directory	Associated chamber of commerce & Ind. of India	1968	Calcutta
3.	Bharat Krishak Samaj Yearbook	Farmer's Forum	1972	Madras
4.	Handbook of Agriculture	I.C.A.R.	1969	New Delhi
5.	Handbook of Animal Husbandary	-do-	1967	New Delhi
6.	Indian Sugar Industry	M/s. M.P. Gandhi & Co.		Bombay
7.	Indian Sugar Yearbook	Indian Sugar Mills Association		Calcutta
8.	Indian Tobacco Directory	Indian Central Tobacco Committee	1960	Madras
9.	Indian Oilseeds Directory	Indian Central Oil-seeds Committee	1964	Hyderabad
10.	Indian Poultry Yearbook 1973-74	Indian Poultry Industry Yearbook	1973	Delhi
11.	Indian Society of Genetics & Plant Breeding Yearbook	Indian Society of Genetics & Plant Breeding	1953	Delhi
12.	Indian Botanical Society Yearbook	Indian Botanical Society	1947	New Delhi
13.	ISAE Directory	Indian Society of Agriculture Engg.	1973	Ludhiana
14.	U.P.A.S.I. Planting Directory	United Planters Association of Southern India	1942	Coonor
15.	Krishinagar Diary, 1973-74	J.N.K.V.V.	1973	Jabalpur

Continued

1	2	3	4	5
16.	Yearbook of Indian National Service Academy	I.N.S.A.	1971	New Delhi
17.	Yearbook of International Society of Plant Morphologist	Indian Society of Plant Morphologist	1972	New Delhi

APPENDIX - E

DIRECTORIES OF SCIENTIFIC INSTITUTES & PERSONNEL

Sl. No.	Title	Sponsor	Year	Place
1	2	3	4	5
	International			
1.	Agricultural Research Index 2 vols.	Francis Hodgson	1970	U.K.
2.	Arid Land Research Institutions a world directory	University of Arizona	1967	Arizona
3.	International Directory of Agricultural Engineering Institutions	F.A.O.	1968	Rome
4.	Research Facilities in science & Technology in Asia	UNESCO	1968	Paris
5.	World Directory of Agricultural Libraries and Documentation Centres	IAALD	1960	Rome
6.	World of Learning	Europe - a Publication	1971	England
	India			
7.	Agricultural Research in India Institutes and Organisations	I.C.A.R.	1958	Delhi
8.	Directory of National Research Institutions in India	INSDOC	1969	Delhi

Continued

1	2	3	4	5
	Japan			
9.	Directory of National Research Institutions for Agriculture and Fisheries in Japan	M/Agriculture & Forestry	1966	Japan
	U.S.A.			
10.	Directory of Organisations and Field Activities of the Department of Agriculture. U.S.D.A. Agric. Handbook No. 76	U.S.D.A.	1962	Washington
11.	Yearbook of Agriculture (Annual)	U.S.D.A.	Annual	Washington
	Europe			
12.	European Research Index, 2 vols.	Francis Hodgson	1973	U.K.
	U.K.			
13.	ASLIB Directory 2 vols.	ASLIB	1970	U.K.
	Personnel			
14.	List of research workers in the Agricultural Sciences in Commonwealth & the Republic of Ireland	CAB	1969	England
15.	Professional workers in state Agricultural Experiment stations and other cooperative State institutions U.S.D.A. Agric Handbook No. 305	USDA	1972-73	Washington
16.	World List of Rice workers	F.A.O.	1968	Rome

RANKING OF PERIODICALS IN CHEMISTRY FROM THE POINT OF VIEW OF INDIAN SCIENTISTS

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Number of journals in scientific and technical fields has increased considerably which makes the selection of titles in a library more difficult. Ranking of journals could be a useful guide. Citations appearing in the Indian Journal of Chemistry, vol.8(1-6), 1970 are analysed. 219 titles cited are ranked and a comparison made with the Chemical Abstracts Source Index.

1 *Introduction*

With the increased participation of Government in the development of science and technology the impetus of research in these fields have gained great momentum during the present century and more particularly after 1950's. The number of scientific periodicals also increased at a faster rate and stood at 60, 000 in 1960. With the present rate of growth, the number is likely to touch 100, 000 mark by the end of the present century (Figure 1). The rapid expansion of research completely outstripped the capacity of Society journals and as a consequence a number of commercial periodicals were started in specialised fields. The cost of these periodicals went up at a faster rate due to various reasons. The price index of U.S. periodicals in Physics and Chemistry went up from 100 in 1959 to 380 in 1971 [1]. Similar rate of increase is also witnessed in journals published in other countries.

The ever increasing number of scientific periodicals, their cost and the space required for storing them, have made it impossible for the libraries to subscribe to all periodicals of their interest. The libraries are required to make selection, a purposeful one, of periodicals to be subscribed. The libraries usually follow one or more of the following techniques in making their selections.

i) Recommendations by experts.
ii) Recommendations by librarians and documentalists.
iii) Notes and Reviews.
iv) Ranking of the periodicals by their frequency of citation.

The present study is an attempt in the last technique, in the field of chemistry.

2 *Scope*

The aim of this study is to find out the journals frequently cited by the Indian scientists in the field of Chemistry. The source journal chosen for this purpose is the Indian Journal of Chemistry published by the Publications & Information Directorate of CSIR, New Delhi. This Directorate publishes a number of periodicals as noted below and these are amongst the best published in the country.

1. Journal of Scientific & Industrial Research.

*2. Indian Journal of Biochemistry & Experimental Medicine.

*3. Indian Journal of Chemistry.

4. Indian Journal of Pure and Applied Physics.

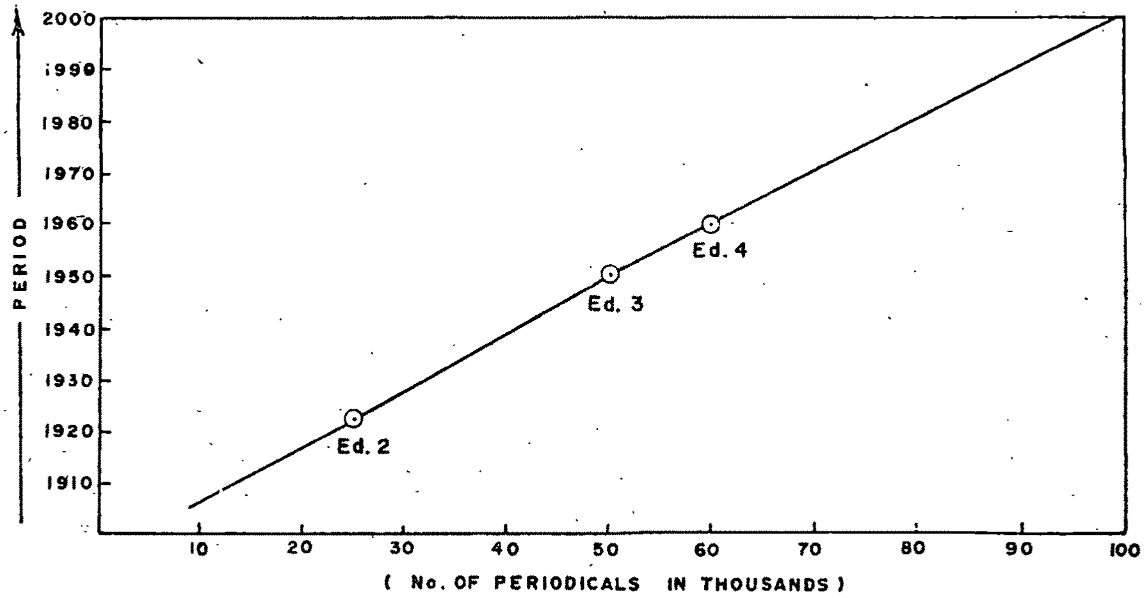
5. Indian Journal of Space.

*6. Indian Journal of Technology.

7. Research & Industry.

From the above list it is evident that the subject chemistry is covered by three journals i.e. (i) Indian Journal of Chemistry, (ii) Indian

N.C.L. Communication no. 1837



No. OF PERIODICALS LISTED IN 2nd., 3rd. & 4th EDITIONS OF WORLD LIST OF SCIENTIFIC PERIODICALS

Journal of Biochemistry & Experimental Medicine and (iii) Indian Journal of Technology. By chosing only one title amongst them i.e. Indian Journal of Chemistry the scope of the subject has been further narrowed down to theoretical and pure Chemistry only. This has been done for two reasons. The first being the voluminous data to be handled and the second to have a closer study of the point of view of a particular group of scientists doing basic research in the field.

The period covered is from January to June 1970 i.e. Indian Journal of Chemistry. 1970, 8 (No. 1-6).

3 *Analysis*

3.1 *Source Journal*

The six issues of Vol. 8, 1970 of the source journal Indian Journal of Chemistry selected for study contained 137 main articles and 56 short communications. Thus of the total articles, 71% are main papers and 29% are short communications. Amongst the main articles only 3 are contributed by foreign authors, two in joint authorship and one by a single author. One short communication is contributed by a foreign author in the capacity of a joint author. Rest of the articles are contributed by Indian scientists. Therefore, the present analysis will indicate more or less the point of view of only Indian scientists.

3.2 *Source Papers and Citations*

As given in Table 1 the main papers (137) contained 1863 citations averaging 13.6 per paper. The short communications (56) accounted for 393 citations averaging 7.018 per communication. Overall average of citations, thus becomes 11.689 per paper. It is apparent that authors have tried to be more selective in citing references in short communications and have cited only about half the number compared to that of the citations in the main papers.

Out of 2256 citations 1958 are to periodical publications and the remaining 298 to non-periodical publications. This shows that main source of references are journals giving 86.76% citations in the present study. Citations from non-periodical publications account for 13.25% only.

3.3 *Citations to non-periodical Publications*

As observed from Table 2 a large number of references cited from the non-periodicals are from books, accounting for 81.21% amongst the non-periodicals citations. Next comes theses having 12.42% followed by (1) Patents, (2) Symposium and Seminars and (3) Reports at (i) 3.35%, (ii) 1.68% and 1.34% respectively.

3.4 *Citation to Periodical Publications*

Amongst the references cited from periodical publications, 63.38% come from the first twenty titles and the next 23 titles account for another 16.45%. Thus 79.83% references are from only first 43 journals as given in Table 3. 3 citations are to unpublished papers and 3 more references could not be deciphered. The remaining 19.87% citations are from the residual 176 journals. The total number of journals cited are 219. The titles of these journals along with the number of references cited from them are given in the Table 4. The titles are arranged in the sequence of decreasing number of citations and amongst the same number of citations alphabetically.

A study of Table 5 will reveal that U.S.A., U.K., U.S.S.R., West Germany, India Netherlands, Japan, Switzerland and France, accounting for 49, 38, 22, 21, 18, 12, 9, 8 and 8 titles respectively, are the favoured countries among the Indian scientists. This bias may be due to the number of journals published in a country, language of the journals and the availability of these titles to the Indian scientists.

3.5 *The first 20 most cited Periodicals*

Table 6 gives the first 20 most cited periodicals which are arranged in the sequence of decreasing number of citations. Rank order given in Chemical Abstracts Source Index is also indicated against each title. It is interesting to note that the three Indian journals which secure third, seventh and fourteenth ranks in the present study, find only 61st, nil and 148th places respectively in the Chemical Abstracts Source Index list. Six journals from among the first 20 of Source Index list find place in the present list. The most cited journals by Indian scientists are the (1) Journal of American Chemical Society, (2) Journal of Chemical Society, U.K. and (3) Indian Journal of Chemistry coming in the same sequence. It is evident that there is a national bias in citing the references.

Table 7 gives scattering of references chronologically among the first 20 most cited periodicals. 3.22% citations are from earlier than 1920's, 6.85% citations from 1921 to 1940, 8.63% citations from 1941 to 1950, 25.86% citations from 1951 to 1960 and 55.44% citations are from 1961 to 1970. The percentage of references cited goes on decreasing along with time and the most recent decade accounts for more than half (55.44%) of the references. German periodicals which find eleventh and eighteenth places in the present study have a different story to tell. The number of references cited from these periodicals are more from older volumes and the most recent decade accounts for only 5.41% and 13.29% respectively for these two journals. This shows that comparative importance of German periodicals is more for older volumes.

4 *Conclusion*

Due to enormous growth in scientific literature, the scientists are tending to publish short communications. This economises both in terms of space and time considerably. This is evident from short communications accounting for 30% of the total articles. Short communications are more selective in citing references. The major source of information are periodicals (86.76% citations). The ranks of periodicals obtained in the present analysis could be a guide to select chemical journals, subject to the following limitations.

1. Source journal and period of study being limited, it will have its own weakness in generalising the above findings.
2. The citations are chosen by scientists who judge its relevancy, which may not be free from psychological and sociological aspects of the individual scientists.
3. Availability of references and its languages may affect the trend of citations.
4. National bias may be a factor in selecting the references.
5. This is a partial picture as the references cited may not be exhaustive [2].

No Indian journal is present among the first 50 of "Chemical Abstracts Source Index List". As reported by Sengupta [3], Browns list as well as 1944 list did not contain any Indian journal. This calls for some comment. The list of first 20 periodicals obtained in the present study contains three Indian journals having ranks 3, 7 and 14. Trend in citing the

German periodicals is on the decrease over the passage of time. Thus the older volumes of German periodicals are still in much use. The Table 7 could be a guide in selecting the back sets to economise the space which is a scarce commodity in all libraries.

Acknowledgement

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[3] SENGUPTA, I N: Ranking of periodicals in the field of medical sciences from the Indian scientist's point of view; analysis of data for 1954-58. Iaslic Bull. 1970, 15, 120.

TABLE - 1

SOURCE PAPERS AND CITATIONS

Main articles	Citations in main articles	Average	Short Communications	Citations in short Communications	Average	Overall average
137	1863	13.6	56	393	7.18	11.689

TABLE - 2

CITATIONS OF NON PERIODICAL PUBLICATIONS

Sr. No.	Category	Citations	Percentage	Overall percentage
1.	Books, monographs, etc.	242	81.21	10.73
2.	Theses	37	12.42	1.67
3.	Patents	10	3.35	0.44
4.	Symposium and Seminars	5	1.68	0.22
5.	Reports	4	1.34	0.18
	TOTAL	298	100.00	13.24

TABLE - 3

CITATIONS OF PERIODICAL PUBLICATIONS

Sr. No.		No.	Percentage among the periodical citations	Overall percentage
i)	Citations from first 20 titles	1244	63.53	55.14
ii)	Citations from the next 23 titles	322	16.45	14.27
iii)	Citations from the remaining 176 titles	386	19.72	17.09
iv)	Citations wrongly quoted	3	0.15	0.13
v)	Unpublished ciations	3	0.15	0.13
	TOTAL	1958	100.00	86.76

TABLE - 4

PERIODICALS CITED

Sr. No.	Title of the Journal	No. of citations
1.	Journal of the American Chemical Society, Washington	279
2.	Journal of the Chemical Society, London	198
3.	Indian Journal of Chemistry, New Delhi	123
4.	Tetrahedron, London	69
5.	Journal of Organic Chemistry, Washington	58
6.	Journal of Chemical Physics, London	52
7.	Journal of the Indian Chemical Society, Calcutta	52
8.	Journal of Physical Chemistry, Washington	51
9.	Tetrahedron Letters, London	48
10.	Journal of Inorganic & Nuclear Chemistry, London	41
11.	Chemische Berichte (Berichte der Deutschen Chemischen Gesellschaft), Heidelberg	40
12.	Transactions of the Faraday Society, London	39
13.	Analytical Chemistry, Washington	33
14.	Current Science, Bangalore	29
15.	Australian Journal of Chemistry, Melbourne	25
16.	Bulletin de la Societe Chimie de France, Paris	23
17.	Inorganic Chemistry, Washington	23

Continued

1	2	3
18.	Justus Liebigs Annalen der Chemie, Weinheim	21
19.	Canadian Journal of Chemistry, Ottawa	20
20.	Chemistry and Industry, London	20
21.	Journal of Scientific & Industrial Research, New Delhi	19
22.	Zeitschrift fur Anorganische und Allgemeine Chemie, Leipzig	19
23.	Nature, London	18
24.	Acta Chemica Scandinavica, Copenhagen	17
25.	Analytica Chimica Acta, Amsterdam	16
26.	Chemical Reviews, Washington	16
27.	Collection of Czechoslovak Chemical Communications, Prague	16
28.	Helvetica Chimica Acta, Basel	16
29.	Journal of Chemical Society: 'D', London	16
30.	Physical Review, New York	15
31.	Bulletin of the Chemical Society of Japan, Tokyo	14
32.	Journal of the Pharmaceutical Society of Japan, Tokyo	14
33.	Proceedings of the Indian Academy of Sciences, Calcutta	13
34.	Journal of the Chemical Society of Japan, Tokyo	12
35.	Chemical and Pharmaceutical Bulletin of Japan, Tokyo	11
36.	Journal of Chemical Society: 'A', London	11
37.	Spectrochimica Acta, London	11
38.	Talanta, London	11
39.	Angewandte Chemie ("Chemie" during 1942-45), Heidelberg	10
40.	Journal of the Electrochemical Society, New York	10
41.	Recueil des Travaux Chimiques des pays-bas, Belegigue, The Hague, Netherlands	10
42.	Zeitschrift fur Analytische Chemie, Wiesbaden, Germany	10
43.	Industrial and Engineering. Analytical edition, Washington	9
44.	Journal of Colloid and Interface Science, New York	9
45.	Quarterly Review, London	9
46.	Biochemical Journal, London	8
47.	Comptes Rendus hebdomadaries des Seances de L'academie des Sciences, Paris	8
48.	Proceedings of the Royal Society, London	8
49.	Industrial and Engineering Chemistry. (A.C.S.), Washington	6
50.	Journal of the Chemical Society 'C', London	6
51.	Monatschefte fur Chemie, Viena	6
52.	Russian Journal of Inorganic Chemistry: Moscow. (Translation)	6
53.	Analyst, London	5
54.	Chemist Analyst, Phillipsburg, U.S.A.	5
55.	Gazzetta Chimica Italiana, Rome	5
56.	Journal of Applied Physics, New York	5
57.	Journal of Chemical and Engineering Data, Washington	5

Continued

1	2	3
58.	Journal of the Chemical Society 'B', London	5
59.	Journal of Electroanalytical Chemistry, Amsterdam	5
60.	Journal of Pharmacy and Pharmacology, London	5
61.	Naturwissenschaften, Berlin	5
62.	Phytochemistry, New York	5
63.	Proceedings of the Physical Society, London	5
64.	Zhurnal Neorganicheskoi khimii, Moscow.	5
65.	Bulletin of National Institute of Science, India, New Delhi	4
66.	Cereal Chemistry, St. Paul., U.S.A.	4
67.	Electrochimica Acta, London	4
68.	Inorganica Chimica Acta, Padua, Italy	4
69.	Journal fur Praktische Chemie, Leipzig	4
70.	Journal of the Society of Chemical Industry, London	4
71.	Nippon Kagaku Zasshi, Tokyo	4
72.	Rasayanam, Poona	4
73.	Zeitschrift fur Physikalische Chemie, Frankfurt	4
74.	Zhurnal Analiticheskoi Khimii, Moscow	4
75.	Acta Crystallographica, Copenhagen	3
76.	Applied Physics Letters, New York	3
77.	Canadian Journal of Research, Ottawa	3
78.	Chimia, Aarau, Switzerland	3
79.	Coordination Chemistry Reviews, Amsterdam	3
80.	Indian Journal Applied Chemistry, Calcutta	3
81.	Indian Journal of Pure and Applied Physics, New Delhi	3
82.	Journal of Chemical Education, Washington	3
83.	Journal de Chimie Physique, Paris	3
84.	Journal of Organometallic Chemistry, Amsterdam	3
85.	Kristallografiya, Moscow	3
86.	Physica Status Solidi, Berlin	3
87.	Proceedings of the Chemical Society, London	3
88.	Russian Chemical Reviews, Moscow (Translation)	3
89.	Zeitschrift fur Anorganische Chemie, Leipzig	3
90.	Zeitschrift fur Chemie, Leipzig	3
91.	Zeitschrift fur Naturforschung. A+B, Taebingen, Germany	3
92.	Zeitschrift fur Physiologische Chemie. (Hoppe Seyler's), Strasburg, Germany	3
93.	Zhurnal fizicheskoi khimii, Moscow	3
94.	Zhurnal Obschchei Khimii (Journal of General Chemistry), Moscow	3
95.	Acta Metallurgica, London	2
96.	Annali di Chimica, Rome	2
97.	Annales de la Real Sociedad Espanola de Fisica of Quimica, Madrid, Span	2
98.	Bulletin Society Chimique de Belges, Brussels, Belgium	2

Continued

1	2	3
99.	Chemistry & Physics of Lipids, Amsterdam	2
100.	Discussion of the Faraday Society, London	2
101.	Doklady Akademii Nauk SSSR (Proceedings of the Academy of Sciences of USSR), Moscow	2
102.	Doklady Academy nauk SSSR: Physical Chemistry Section, Moscow	2
103.	Inorganic & Nuclear Chemistry Letters, London	2
104.	Journal of the American Oil Chemists Society, Chicago	2
105.	Journal of the American Pharmaceutical Association, Washington	2
106.	Journal of Biological Chemistry, Baltimore	2
107.	Journal of Catalysis, New York	2
108.	Journal of the Chinese Chemical Society, Taipei	2
109.	Journal of the Institute of Chemists of India, Calcutta	2
110.	Journal of less common metals, Amsterdam	2
111.	Journal of Polymer Science, New York	2
112.	Journal of South African Chemical Institute, Johannesburg	2
113.	Journal of Scientific Research of Banaras Hindu University, Varanasi	-
114.	Journal of University of Bombay	2
115.	Mikrochimica Acta, Vienna	2
116.	Proceedings of the Indian Science Congress, Calcutta.	2
117.	Russian Journal of Physical Chemistry, Moscow	2
118.	Separation Science, New York	2
119.	Starch, New York	2
120.	Uchenye Zapiski. Kazakhskii Gosudarstvennyi Universit et (Scientific Papers Kazakh State University), Kazan	2
121.	Acta Chimica Academiae Science, Hungary	1
122.	Acta Facultatis Rerum Naturalism Universitatis Comeniaae Botanica, Czechoslovakia	1
123.	Acta Physica, Budapest	1
124.	Acta Phytochimica, Tokyo	1
125.	American Dyestuffs Reporter, New York	1
126.	Annals of Applied Biology, London	1
127.	Annalen der Physik, Leipzig	1
128.	Annals of Physics, New York	1
129.	Annual Review of Nuclear Science, Palo Alto, U.S.A.	1
130.	Archives of Biochemistry and Biophysics, New York	1
131.	Archives of Dermatology, Chicago	1
132.	Atomic Energy Review, Vienna	1
133.	Biochemical and Biophysical Research Communications, New York	1
134.	Biochimica et Biophysica Acta, Amsterdam	1
135.	British Journal of Pharmacology and Chemotherapy, London	1
136.	Canadian Chemistry and Process Industry, Toronto	1
137.	Carbohydrate Research, Amsterdam	1

Continued

1	2	3
138.	Chimie Analytique, Paris	1
139.	Czechslovak Journal of Physics, Prague	1
140.	Dissertations Pharmaceuticae, Warsaw	1
141.	Energia Nucleare, Milan	1
142.	Experientia, Basel	1
143.	Farmaco Edizione Scientifica, Paria, Italy	1
144.	Fette Seifen Anstrichmittel, Hamburg, Germany	1
145.	Formosan Science, Taipei Taiwan	1
146.	Holzals Roh-und Werkstoff, Berlin	1
147.	Indian Journal of Pharmacy, Bombay	1
148.	Indian Oil and Soap Journal, Calcutta	1
149.	Izvestia Akademii Nauk SSSR, Moscow	1
150.	Izvestia Seklova Plating Drugikhi Belgorodnykh, Metallov Obshchei i Neorganicheskoi Khimii, Akademiya, Nauk SSSR, Moscow	1
151.	Japan Analyst, Tokyo	1
152.	Journal of Agricultural and Food Chemistry, Washington	1
153.	Journal of the American leather Chemists Association, Ohio	1
154.	Journal of Applied Physics. Supplement, New York	1
155.	Journal of Chromatography, Amsterdam	1
156.	Journal of General Chemistry of the USSR, Moscow	1
157.	Journal of General Physiology, New York	1
158.	Journal of Heterocyclic Chemistry, New Mexico, USA	1
159.	Journal of the Indian Institute of Sciences, Section 'A', Bangalore	1
160.	Journal of the Indian Society of Soil Science, Delhi	1
161.	Journal of Molecular Spectroscopy, New York	1
162.	Journal of the Optical Society of America, New York	1
163.	Journal de Pharmacie et de Chimie, Paris	1
164.	Journal of Pharmacology and Experimental Therapeuties, Baltimore	1
165.	Journal of Pharmaceutical Sciences, Washington	1
166.	Journal of Physics and Chemistry of Solids, London	1
167.	Journal de Physique et la Radium, Paris	1
168.	Journal of Physical Society of Japan, Tokyo	1
169.	Journal of the Polarographic Society, London	1
170.	Journal and Proceedings of the Royal Society of New South Wales, Sydney, Australia	1
171.	Journal of the Royal Sanitary Institute, London	1
172.	Journal of the Science of Food and Agriculture, London	1
173.	Journal of the Society of Chemical Industry, Japan	1
174.	Journal of the Society of Cosmetics Chemists, London	1
175.	Journal of the Taiwan Pharmaceutical Association, Taipei	1

Continued

1	2	3
176.	Journal of the Textile Institute, Manchester, U.K.	1
177.	Khimiko Farmatsevticheskii Zhurnal, Moscow	1
178.	Khimiya Industriya, Sofia	1
179.	Kinetikai Kataliz, Moscow	1
180.	Kolloid Zeitschrift, Darmstadt	1
181.	Kolloid Zhurnal, Moscow	1
182.	Lancet, London	1
183.	Magyar Kemiai Folyoirat, Budapest	1
184.	Magyar Kemikusok Lapja, Budapest	1
185.	Makromolekulare Chemie, Basel	1
186.	Microchemical Journal, New York	1
187.	Notas defisica, Centro, Brasileiro de pesquisasfisica, Riodejaneiro	1
188.	Oil and Soap, Chicago	1
189.	Optics and Spectroscopy, Leningrad, (Translation)	1
190.	Paper Trade Journal, New York	1
191.	Perfumery and Essential Oil Record, London	1
192.	Pharmaceutica Acta Helvetiae, Geneva	1
193.	Pharmaceutisch Weekblad, Hilversum, Netherlands	1
194.	Physics and Chemistry of Solids, London	1
195.	Physical Review Letters, New York	1
196.	Presse Medicale, Paris	1
197.	Proceeding of the Iowa Academy of Science, U.S.A.	1
198.	Proceedings of the National Academy of Sciences of the United States of America, Washington	
199.	Proceedings of the National Institute of Sciences of India, New Delhi	1
200.	Pure and Applied Chemistry, London	1
201.	Revue Internationale des Hautes Temperature et des Refractaires, Paris	-
202.	Reviews of Pure and Applied Chemistry, Melbourne	1
203.	Revista de Chimie, Bucharest	1
204.	Ricerca Scientifica, Rome	1
205.	Science and Culture, Bangalore	1
206.	Seifen - Old-Fette Wachse, Ausburg, Germany	1
207.	Soap and Chemical Specialities, New York	1
208.	Surface Science, Amsterdam	1
209.	Svensk Kemisk Tidskrift, Stockholm	1
210.	Technical Association of the Pulp and Paper Industry, New York	1
211.	Technische Mitteilungen Krupp, Essen, Germany	1
212.	Transactions of the Institute of Metal finishing, London	1
213.	Ukrainskii Khimicheskii Zhurnal, Kiew	1
214.	University of Kansas Science Bulletin, U.S.A.	1
215.	Zeitschrift fur Kristallographie, Kristallogeometrie, Kristallphysik, Kristallchemie, Frankfurt	1
216.	Zeitschrift fur Physik, Berlin	1
217.	Zhurnal Prikladnoi khimii, Lenigrad	1
218.	Zhurnal Prikladnoi Spektroskopii, Minsk	1
219.	Zhurnal Strukturnoi Khimii, Moscow	1

TABLE - 5

COUNTRYWISE DISTRIBUTION

Country	Periodicals with 20 or more references	Periodicals with 10-12 references	Periodicals with below 10 references	Total
Australia	1	X	2	3
Belgium	X	1	2	3
Brazil	X	X	1	1
Bulgaria	X	X	1	1
Canada	1	X	2	3
Czechoslovakia	X	1	2	3
Denmark	X	1	1	2
France	1	X	7	8
Germany	2	4	15	21
Hungary	X	X	4	4
India	3	2	13	18
Italy	X	X	6	6
Japan	X	4	5	9
Netherlands	X	1	11	12
Poland	X	X	1	1
Rumania	X	X	1	1
Spain	X	X	1	1
South Africa	X	X	1	1
Sweden	X	X	1	1
Switzerland	X	1	7	8
Taiwan	X	X	3	3
U.K.	7	5	26	38
U.S.A.	6	3	40	49
U.S.S.R.	X	X	22	22
Total	21	23	175	219

TABLE - 7

First 20 periodicals and their citations analysed chronologically

			-1920	1921-40	1941-50	1951-60	1961-70	Total
1.	J. Amer. Chem. Soc.	No.	3	22	52	120	82	279
	(V 1- ; 1879-)	%	(1.08)	(7.88)	(18.64)	(43.01)	(22.39)	
2.	J. Chem. Soc. (London).	No.	8	28	22	67	73	198
	(V 1- ; 1849-)	%	(4.04)	(14.14)	(11.11)	(33.84)	(36.87)	
3.	Indian J. Chem.	No.	x	x	x	x	123	123
	(V 1- ; 1963-)	%	x	x	x	x	100	
4.	Tetrahedron	No.	x	x	x	8	61	69
	(V 1- ; 1957-)	%	x	x	x	(11.59)	(88.41)	
5.	J. Org. Chem.	No.	x	1	4	10	43	58
	(V 1- ; 1936-)	%	x	(1.72)	(6.90)	(17.24)	(74.14)	
6.	J. Chem. Phys	No.	x	3	5	12	32	52
	(V 1- ; 1933-)	%	x	(5.77)	(.61)	(23.08)	(61.54)	
7.	J. Indian Chem. Soc.	No.	x	3	4	19	26	52
	(V 1- ; 1928-)	%	x	(5.77)	(7.69)	(36.54)	(50.00)	
8.	J. Phys. Chem.	No.	x	1	2	14	34	51
	(V 1- ; 1896-)	%	x	(1.96)	(3.92)	(27.45)	(66.67)	
9.	Tetrahedron Lett.	No.	x	x	x	1	47	48
	(1959-)	%	x	x	x	(2.08)	(97.92)	
10.	J. Inorg. Nucl. Chem.	No.	x	x	x	6	35	41
	(V 1- ; 1955-)	%	x	x	x	(14.63)	(85.37)	
11.	Chem. Ber. (Ber. Deut. Chem. Geo)	No.	20	11	5	3	1	40
	(V 1- ; 1868-)	%	(50.00)	(27.50)	(12.50)	(7.50)	(2.50	
12.	Trans. Faraday Soc.	No.	x	6	4	12	17	39
	(V 1- ; 1905-)	%	x	(15.38)	(10.27)	(30.76)	(45.59)	
13.	Anal. Chem.	No.	x	x	x	23	10	33
	(V 19- ; 1949-)	%	x	x	x	(69.70)	(30.30)	

Continued

14.	Curr. Sci.	No.	x	x	1	2	26	29
	(V 1- ; 1932-)	%	x	x	(3.45)	(6.90)	(89.65)	
15.	Aust. J. Chem.	No.	x	x	x	2	23	25
	(V 6- ; 1953-)	%	x	x	x	(8.00)	(92.00)	
16.	Bull. Soc. Chim. Fr.	No.	1	3	7	9	3	23
	(V 1- ; 1858-)	%	(4.35)	(13.05)	(30.45)	(39.10)	(13.05)	
17.	Inorg. Chem.	No.	x	x	x	x	23	23
	(V 1- ; 1962-)	%	x	x	x	x	(100.00)	
18.	Justus Leibigs Ann. Chem.	No.	8	6	2	2	3	21
	(V 1- ; 1832-)	%	(38.10)	(28.57)	(9.52)	(9.52)	(13.29)	
19.	Can. J. Chem.	No.	x	x	x	6	14	20
	(V 13- ; 1935-)	%	x	x	x	(30.00)	(70.00)	
20.	Chem. Ind. (London)	No.	x	1	x	6	13	20
	(V 1- ; 1923-)	%	x	(5.00)	x	(30.00)	(65.00)	
	TOTAL	No.	40	85	108	322	689	1244
		%	(3.21)	(6.83)	(8.64)	(25.87)	(55.45)	

TABLE - 6

COMPARISON OF THE RANKING OF THE FIRST 20 PERIODICALS WITH THAT OF "SOURCE INDEX" LIST

Sr. No.	The present ranking	Rank order of Chemical Abstracts Service: Source Index (1970)
1.	J. Amer. Chem. Soc.	2
2.	J. Chem. Soc. (London)	24
3.	Indian J. Chem.	61
4.	Tetrahedron	41
5.	J. Org. Chem.	8
6.	J. Chem. Phys.	3
7.	J. Indian Chem. Soc.	X
8.	J. Phys. Chem.	11
9.	Tetrahedron Letters	5
10.	J. Inorg. Nucl. Chem.	49
11.	Chem. Ber (Ber. Deut. Chem. Ges.)	46
12.	Trans. Faraday Soc.	59
13.	Anal. Chem.	39
14.	Curr. Sci.	148
15.	Aust. J. Chem.	69
16.	Bull. Soc. Chem. Fr.	13
17.	Inorg. Chem.	30
18.	Justus Liebigs Ann. Chem.	137
19.	Can. J. Chem.	28
20.	Chem. Ind. (London)	90

RECENT ADVANCES IN DOCUMENT DESCRIPTION AND REPRESENTATION : ISBD AND PRECIS

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The circumstances leading to the adoption of the new method of document description viz. the ISBD and also the new system of subject indexing viz. PRECIS are discussed and explained. The far reaching consequences of these two developments are also brought out.

In any type of library and information service, ultimately two things are most important. In fact the effectiveness of the service depends largely on them. These two vital jobs are, in modern terminology, document description and document representation. By document description we mean largely that aspect of describing a document which brings out its authorship, distinctive title, edition, imprint and particulars about the physical make up of it, in fact everything that clearly distinguishes a particular document from all other documents. By document representation, we mean describing or representing the other aspect of a document i.e., its subject content or 'aboutness'

Whenever we think of document description and representation in a systematic way, we actually think in term of some surrogates, like a catalogue entry, an entry in bibliographical list or similar bibliographic records. Most of the surrogates that are created in library and information centres are actually combination of both – description and representation. Various groups of people have worked in the field and it has a long history. In this paper two recent developments of far reaching consequences, one on the document description side and the other on the document representation side, viz ISBD (International Standard Bibliographic Description and PRECIS (Preserved Context Indexing System) respectively, are being discussed and the general background leading to their development brought out.

Perhaps, the bibliographers as a group had the longest domination in the field, then came the librarians followed by other information workers, like abstractors, indexers, etc. Bibliographers' interest was mainly centred around the aspects of the physical make-up of a document. Thus they accounted for every unnumbered page, indicated the size of the paper, the number of folds, and watermark, gave information about collophon, signature, indication of any peculiarity of the copy being described, and so on. Early cataloguers relied heavily on the technique of book description perfected by the bibliographers. Quite a few items of information recommended by the bibliographers entered into the catalogue entry also. In course of time, when the need to codify the prevailing cataloguing practices was felt, some of the items came for closer scrutiny. As a result, some of them were dropped, as they were found not so essential in the description of a document in the continuously changing context, and a few of them have been modified. Perhaps the last major efforts towards systematisation of rules for document description, along with other more important aspects of cataloguing, were the holding of the International Conference on Cataloguing Principles, 1961 (ICCP) and the subsequent publication of the blue book - the Anglo-American Cataloguing Rules in 1967.

Events seem to have moved faster since then. Just after ten years of the Paris Conference, in 1971 the ISBD has come out in its final form after two years of work. The implementation of the ISBD was so quick in some areas that even some professional librarians were completely taken by surprise. Thus in the Library Journal, we find the following remarks by a professional – "I, for one, wonder how such a far-reaching recommended standard could have reached this advanced stage of development with so little public notice" [1]. However, it is also maintained that ISBD is one of the products, perhaps the latest, of the train of activity set in motion by the Paris Conference in 1961. The system was actually worked out by a Working Group set up by the International Meeting of Cataloguing Experts in 1969. The text explaining the working and application of ISBD was issued in 1971 by the IFLA Committee on Cataloguing. Almost simultaneously, from 1972 a number of important national bibliographies have started using the ISBD in their published lists. The latest tally is that 8 national bibliographies and other institutions are using and 6 others are thinking of introducing it [2].

It may be mentioned here that this international agreement on a standard method of document description, through the ISBD, was hastened to a large extent with the introduction of projects like MARC by the Library of Congress. It was realised, beyond any measure of doubt, that if the input to a large system is decentralised and if bibliographical information is to be exchanged on an international scale, then document description had to be completely standardised. The requirements of a machine readable file also not only pointed towards this necessity but also demanded even more compatibility with regard to punctuation, format, sections etc.

It is remarkable that the same project viz., MARC was also responsible, to a large extent, in improving the document representation aspect of surrogate making. This happened through the introduction of the PRECIS indexing. To get a feel of the far reaching effects of these two developments let us have a close look at a typical entry of the British National Bibliography (BNB) reproduced below:

620.19233 — Materials: Fibre reinforced
plastics. Deformation
Spencer, Anthony James Merrill. Deformations of fibre-reinforced materials/[by] A.J.M. Spencer. — Oxford: Clarendon Press, 1972. — [6], 128p: ill; 24cm. — (Oxford science research papers)
Bibl. p.123-125. — Index.
ISBN 0 19 851939 7 Pbk: 3.00
(B72-2414])

The BNB is the only bibliography which is using both ISBD and PRECIS which we consider are the two most important developments in the area of document description and representation. Hence, we have chosen an entry from it. The entry, shown above, is actually a surrogate of a document. Let us try to see how this entry has been able to describe and represent the document for which it stands in the bibliography.

If we ignore the heading in the entry, which has been chosen by the cataloguer and rendered according to certain cataloguing rules, we find that the structure of the entry is quite different from what we usually get following the descriptive cataloguing rules of any cataloguing code. Our familiar indentions, separate sections, punctuation etc. are no longer there. In their place have come some new punctuation marks, some new items of information and an apparent new look. To understand the logic of this new structure it is necessary to go into some details of the ISBD.

It is known that a document description is not only required in a catalogue but also in various bibliographical activities, like announcement of new publications, acquisition and distribution of books etc., ISBD actually takes care of all such activities. It therefore includes elements which may be necessary to all... For a particular purpose a selection from the elements comprising the full standard description may be used. This brings out one important characteristic of ISBD i.e., it is not meant for descriptive cataloguing only but for other bibliographical works also.

It was soon realised that a single standard could not cope up with the bibliographical description of all types of documents. Hence, three separate standards were prepared to take care of the main types of documents. They are ISBD(M) for monographs, ISBD(S) for serials, and ISBD(A-V) for audio-visual materials. We are here concerned mainly with the ISBD(M).

The seven broad areas and the elements under them are as follows:

1. Title and statement of authorship area
    - 1.1 Title proper
    - 1.2 Parallel titles, other title(s) and title information
    - 1.3 Statement(s) of authorship

2. Edition area
    - 2.1 Edition statement
    - 2.2 Statement(s) of authorship relating to the edition

3. Imprint area
    - 3.1 Place of publication
    - 3.2 Name of publisher
    - 3.3 Date of publication
    - 3.4 Place of printing
    - 3.5 Name of printer

4. Collation area
    - 4.1 Number of volumes and/or number of pages
    - 4.2 Illustration statement
    - 4.3 Size
    - 4.4 Accompanying materials

5. Series area

6. Notes area

7. International Standard Book Number, binding and price area
    - 7.1 ISBD
    - 7.2 Binding
    - 7.3 Price

Each of the above element is indicated by prescribed punctuation mark and symbol. Thus the elements put with the appropriate punctuation marks will look as follows in a skeleton entry:

Title proper = parallel title: other title(s)/ statements(s) of authorship. - Edition statement/statement(s) of authorship relating to the edition. - Place of publication: name of publisher, date of publication (plate of printing: name of printer). - Number of volumes and/or number of pages: illustration statement; size and accompanying materials. - (Series)
Notes
ISEN Binding price

A comparison of the above entry with the structure of the usual main entry in a catalogue will reveal a few interesting differences. The ISBD description starts with the title of a document. It has nothing to do with the heading. This will be determined by the context. If we are thinking in terms of a library catalogue entry, then the rules for the choice and rendering of headings will determine the appropriate heading. After that all other details of the document could be mentioned in the above form.

In the above structure, as had been pointed out earlier, the usual paragraph indentions for each section have been eliminated. From the beginning of the title to the end of the collation element, the whole description is in the form of a single paragraph. But punctuation marks have been used to indicate the starting or termination of an element or group of elements. They are more like 'field tags' i.e., indicator of a field. The main areas are separated by point and dash (. -). But when by paragraphing, typography or identation, one area is clearly separated from another, only a point (.) may be used. A completely new element of description has been introduced i.e., the ISBN. It may also be mentioned that three elements viz. ISBN, binding and price have all been provided at the end, as they are not required in all types of catalogues and lists. Where they are not required, e.g., in a library catalogue, they can be easily eliminated. Thus, it would be noticed that if we eliminate the last part, the description can easily fit into a typical library catalogue entry. Similarly, the full description can easily fit into an entry in a national bibliography, publisher's catalogues and similar lists. In fact Chapter 6 (Description-Separately published monographs) of the Anglo-American Cataloguing Rules (AACR) is being revised in accordance with the ISBD prescription.

The logic behind the need and the prescription of ISBD has been explained by Sumner Spalding, who himself had taken active part in the formulation of both the AACR and ISBD, in the following words [3]:

> "To avoid duplication in cataloguing of current publication, the following plan was conceptualised.
>
> 1. Each country should have a national bibliography or cataloguing service which would be responsible for cataloging all publications of that country for the libraries in that country and for export for use in other countries.
>
> 2. All countries should agree to a standard style of making bibliographical descriptions.
>
> 3. Each national cataloging service should avail itself of the product of the others in providing catalog entries for foreign books for libraries in its own country.

4. Since exchange of this data would eventually be in machine readable form, the potentiality of standardized punctuation as a device to make possible automatic tagging of fields in the description (thereby cutting input costs) should be explored".

It has already been said that ISBD has already got the approval of the ISO. Many people have expressed their surprise at the quick and easy way of this approval because ISO recommendations usually pass through a certain pattern of activities and hence take time which may be anything upto twenty years. This is because standardization has been approached from the other end, so to say. Through the IFLA Committee on Cataloguing, some of the big user groups, like the producers of national bibliographies had met and accepted a standard practice of bibliographical description which would be acceptable to each of them. Thus, acceptance by the major users and ensuring the compatibility of major systems are already guranteed. In such a situation it does not take much time for a proposal, already having the sanction of an international agreement, to go to the stage of an ISO recommendation. This is exactly how the ISBD has come.

Apart from meeting the three basic objectives viz. to make records from different sources interchangeable, to facilitate their interpretation across language barriers; and to facilitate the conversion of such records to machine-readable form, the use of ISBD in different bibliographical activities is likely to have its influence on our cataloguing practices. It has already been mentioned that the rules of the descriptive cataloguing aspect of the AACR, which has come nearest to an international code, are going to be revised soon to accomodate document description according to the ISBD rules. But there is another aspect where ISBD may have its profound influence in cataloguing practice. This is regarding the main entry itself.

It would be generally agreed that in any cataloguing code most of the rules are regarding correct choice of heading which is actually related to the question of authorship or authorial responsibility. It has often been complained that these rules contribute largely to high cataloguing cost. The AACR is supposed to have rationalised these rules to a great extent. Even then one hears occasional complaints. Here is a complaint which will sound very familiar, "... the cause of high cataloging costs is that quite aside from the intricate cataloging rules, necessitated by bibliographic complexity, in many cases the AACR themselves take a labyrinthine approach to the analysis of authorship responsibilities .... To reduce costs we must simplify cataloging rules..." [4]. This simplication, perhaps, cannot come so long as the concept of the main entry is allowed to dominate the catalogue. The main entry is in most cases the author main entry and author approach need not be given more importance than any other approach. There is already an opinion against the concept of the main entry. Perhaps, the chief advocate of this opinion is Jay E. Daily. He believes that the "Main entry turns out, in fact, to be pretty much a will-o-the-wisp. It is a concept deeply imbedded in our practice, but when we come to inquire into the rationale behind it, it is difficult to discover any... what a vast, complicated, unnecessary bibliographic rigmarole we have raised up in order to provide it" [5].

It is quite possible that the wider use of the ISBD will encourage us to get away from the unnecessary bibliographic rigmarole, centred round the main entry, and accept an ISBD entry, starting with the title element, as the 'basic' catalogue entry. This would be a true unit entry. All entries could be easily prepared by just inserting the appropriate headings according to the different approach points for the document. The catalogue would thus become a true retrieval tool. If this happens then it would, perhaps, be the greatest revolution in cataloguing practice so far.

As said earlier, the development of the PRECIS has been the most important development in the realm of document representation. The necessity arose, in this case also, out of the requirements of MARC tape input preparation. It was felt that the two alternative schemes of classification viz., modified Dewey Decimal and the Library of Congress schemes that were used to represent the subject contents of books, in MARC records, were hardly adequate for the purpose. The BNB computerization project also is said to have made BNB look for an alternative indexing system. All these resulted in the development of the PRECIS and its introduction in the BNB.

It may be said that in the MARC record, the subject representation is provided in the form of a subject string only. In the BNB entry that we have reproduced earlier, the feature heading actually carries this string. But in the printed BNB a rotated index providing an alphabetical approach to the classified main part is prepared. So the PRECIS indexing system has two important aspects viz., 1) rules for naming the concepts in the analysed subject, putting the concept-terms in a structured sequence and thus the creation of the string, ii) Rotating the concep-terms in the main string in such a way that approach points are created from every important concept of the same subject and preparation of references to guide the inquires to the appropriate points of approach. It should be mentioned that the PRECIS string is independent of any scheme of classification. The subject is analysed independently and represented according to certain rules. The order of significance of the component terms is determined on the basis of their respective role in the formulation of the subject. For this purpose a set of role operators has been developed and every constituent concept in a compound subject is assigned a role operator which automatically secures its order.

To take an example, a document entitled 'Political aspects of university manpower planning', would be analysed and role operators are assigned in the following way:

Concept analysis:

(5) Education (4) Universities (p) Manpower
(3) Planning (1) Political aspects

n the above example the role operators indicate as follows:

(5) Discipline
(4) Key system
(p) Subsystem, structure, material
(3) Effect, action
(1) Viewpoint, perspective

The above analysis and the significance formula controlled by the role operators finally give us the following string:

Education. Universities. Manpower. Planning. Political aspects. From the bove string a number of index entries are repared, in the BNB, according to a system of rotation, which is more like shunting. The entries would be:

1. Education
    Universities. Manpower. Planning. Political aspects

2. Universities. Education
    Manpower. Planning. Political aspects

3. Manpower. Universities. Education
    Planning. Political aspects

4. Planning. Manpower. Universities.
    Education

5. Political aspects. Planning. Manpower.
    Universities. Education

It must be mentioned that the above is a short description of the PRECIS index as used in the BNB. What is more important is the introduction of PRECIS as a new method of document representation. Since this representation is being incorporated into the BNB-MARC records which in turn are being sent to other countries and organisations, there is every possibility that this may soon become an internationally accepted method of document representation. So far it has not been possible for us to agree to neither an international classification system nor indexing system. The nearest that we can achieve may be a system of document representation like the PRECIS which is neutral of any classification system. In fact it has been proved that the PRECIS concept analysis helps classifiers and indexers irrespective of the scheme they are going to use.

So, then, through ISBD and PRECIS our dual work of document description and representation has taken very important strides in unison in recent years. That there was a wide gap between document description and document representation and that there was a real need for correcting this anamoly was pointed out succintly by Hans Wellisch. He said, "Since these subject headings are an integral part of the product [catalogue entries] which both librarians and the public at large have come to regard as a paragon of quality, in the minds of most users it has become an axiom that the LC subject headings are necessarily of the same high standard as the bibliographical data and that the same painstaking care has been extended both in their formation and in their use for the indication of the 'aboutness' of documents. This, I submit, is a grand and dangerous delusion."[6]

It is now hoped that the introduction of ISBD and PRECIS analysis of subjects will reduce this gap.

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SHORT COMMUNICATION

RULE 3B2 OF THE ANGLO-AMERICAN CATALOGUING RULES: A CRITIQUE

There are a few features of a book i.e. a separately published monograph, which have been recognised as important enough for description in catalogue entries. These features include author, title, subtitle, edition, collaborator, place of publication, publisher, year of publication or copy-right, number of pages or number of volumes, size, series, etc. In many cases, certain other attributes of documents which may be considered of some value and use to the readers by a cataloguer, but not included in the above list, are also added as 'notes' in the catalogue entries. With the passage of time, the order of the features of documents in catalogue entries, has been fixed (as mentioned above) on the basis of their relative value and utility to the users of a library catalogue.

In a dictionary catalogue, heading is considered to be the foundation of an entry. Hence, it is the most important part of a catalogue entry and deserves a befitting consideration and thought on the part of a cataloguer. A heading is important because it is this element which decides the place of a catalogue entry among all other entries in a dictionary catalogue.

Due to the same reason, code makers and cataloguers have analysed further and tried to find out the most important word or element out of the elements constituting a heading. From time to time, they have suggested many permutations and combinations, of the various parts of a heading, to bring out the most potent word or words of a heading.

In short, the effort of a cataloguer is to find out the most important or potent word which would match the approach of a reader and to place this word as the very first word in a heading. In doing so a cataloguer anticipates the working of the mind of a reader for whose use the catalogue is being prepared. Since it is the first word of the heading of an entry which first of all determines the place of a catalogue entry among other entries, a cataloguer is supposed to spend considerable time and thought in selecting this word. This first word in an entry is often referred to as the 'starter word' or the 'entry element'. Because of the importance of 'entry element' each cataloguing code has given it a due significance and a number of rules are always provided in all codes to help a cataloguer in selecting an appropriate entry element.

Among all the catalogue entries of a document, 'main entry' is the basic entry of foremost importance at it serves as the source and basis of all additional entries in respect of a document. The heading of a main entry for a separately published monograph, as has now been accepted universally, should normally consist of the following features in the following order of precedence:

(i) Author; or (ii) Title.

This order has now been recognised after a lot of experimentation, thought and experience. The author gets precedence over the title, as heading, because:

(i) author approach is more common, certain, and reliable as compared to the title approach.

(ii) The exact titles of the majority of documents, as to the exact sequence, spellings of words, etc., are very difficult for most of the readers to remember and recall.

If a reader is unable to recollect and recall the exact titles of documents (which if not impossible, is at least very difficult) the use of title entries in a catalogue is not only reduced to minimum but also their presence in a catalogue is at times of a negative value due to the over loading of catalogues, increase in cataloguing costs, wastage of space, as well as of the time of the readers and the staff, etc. It is, therefore, evident that title can never get precedence over the author, as a heading of a main entry and that title entries for all documents are not useful. These factors have led the cataloguers to decide unanimously and independently that added entries under titles of all documents are not only unwanted but would also be superfluous, meaningless and even disadvantageous.

It is, therefore, clear that author, very logically, claims the first preference as a heading for the main entry of a document. However, the title is considered to be the next best alternative in case:

(i) either the authorship of a work can not be ascertained, or

(ii) is definitely unknown.

This principle of giving author a precedence over title as heading of main entry, has been consistently followed, as in all other good catalogue codes, in A.A.C.R. also, except as provided in its rule No. 3B2.

This rule appears to be a contradiction of the basic and established principles of cataloguing and pushes the author to the second position of preference, in comparison to title as a heading for the main entry of a document, even when the author is definitely known and very clearly mentioned on the title page.

Unfortunately and surprisingly, the two situations which are not identical, not even similar, have been equated and treated alike. If we consider rules no. 2A and 3B2 simultaneously, we find that the rules are contractictory and ambiguous. Rule 2A provides the entry of a work under its title in case its author is either unknown or uncertain. Rule 3B2, on the other hand, also provides for the entry of a work under its title even when the authors of the work, very clearly, definitely and without any ambiguity, have been mentioned on its title page but they happen to be more than three and none of them is indicated as a principal author, either typographically or by wording. It may be pointed out that in this case the authors are at least, neither unknown nor uncertain. Equating this case with the cases to be covered under the provisions of rule 2A is, therefore, ignoring the importance and presence of authors.

The situation becomes all the more complicated and indefensible when one compares rule 3B2 with 3A.

Both the rules cover identical cases with the only difference that in the cases to be covered by rule 3A the principal author is indicated either by typography or wording, and in the cases to be covered by rule 3B2 the principal author is not indicated. Whereas in both the cases the number of authors may be more than three, it must be so in cases to be covered by rule 3B2.

Both the rules 3A and 3B2 provide for an added entry under the first author, in case it is not represented as principal author. It shows that it has been realized, and very rightly, that the first author is in any case important, hence can not be ignored. Because it is always likely to be recalled by the readers while consulting a catalogue.

Why then ignore the first author and make the main catalogue entry under the title as provided by rule 3B2, when the names of the authors appear on the title page of a document and the authors are by no means unknown or uncertain?

It will not be out of place to mention here that the framers of the rules have taken it for granted that the readers would recall the name of a principal author more conveniently, than that of the one mentioned first, even if former is not mentioned at number one. But their confidence seems to have betrayed them in accepting this principle thoroughly and they have hastened to recommend an added entry under the author mentioned at number one, both in rule no. 3A and 3B2. Although this provision of added entry under first author has reduced the adverse impact of rule no. 3B2, yet it fails to vindicate the position and stand taken by the framers of the code in rule no. 3B2.

In fact rule 3B2 is superfluous and could be covered under the provisions of rule 3B1 i.e. enter a work under an author named first on the title page. However, rule 3B1 would need a little modification to include the following provisions:

(i) that in case of three or more joint authors, there will be no added entries for joint authors, but

(ii) an added entry under title.

Therefore, rule 3B2 may be deleted and rule 3Bl should be modified and read as follows:

3Bl Principal Author not Indicated

Enter a work under the author named first, on the title page, if no one is represented as principal author. Make added entries under the other authors if they are not more than three. Make an added entry under the title, only if the number of authors is more than three".

It is hoped that a revision of the rules, 3Bl and 3B2, in the light of the above critique will strengthen the principles of cataloguing, made, accepted and established by cataloguers universally after a long and continuous history of trials and errors.

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SOME PRACTICAL POINTS TO BE KEPT IN MIND WHILE TRANSLATING RUSSIAN SCIENTIFIC AND TECHNICAL LITERATURE INTO ENGLISH

Translations should be readable, intelligible and technically accurate, if they are to be usable.

Readability: The finished translation should in good idiomatic English and should read as if it were a piece of original composition in English. In particular, it should be free of "foreignisms" and clumsy constructions carried over from the original. Strings of genitives which are typical of Russian should be avoided. English infinitives should be used in place of awkward Russian genitive expressions.. The articles "a" and "the" should be used with particular care; when they are misused, reading becomes difficult and sentences become quite often misleading. The omission of articles is equally deplorable. Sentence structure should be lucid and not difficult for reading. Literal translation is not expected: word order and punctuation of English differ fundamentally from those of Russian. Eliminate hard to understand and clumsy word order of the original, and do not adopt the punctuation of the Russian uncritically. Translation, though clear, should not be wordy or repetitive. Many Russian constructions are redundant when literally rendered into English. Verbosity often results in obscurity; it hides the real point of communication and makes reading tiresome. A concise style is preferred. For this purpose, it is at times desirable to run sentences together or to break them up into shorter units. This latter recommendation may be followed also when lengthy and involved constructions are encountered in the original. At the same time no attempt should be made in effecting economy in expression at the expense of substance or cla clarity. Close observation of the text is necessary only in regard to sense, and not in regard to the manner of expression. For example, Russian usage as regards prepositions used in various collocations or as regards the category of number (singular or plural) of nouns does not always correspond to English usage. Great carefulness is needed when rendering verbs and verb forms. There is no sequence of tense in Russian. On the other hand, English verbs have no aspects. A verb that is transitive in Russian may not be transitive in English. Idioms in the original will have to be recognized and rendered accordingly. There are many words in both Russian and English which contain Greek or Latin elements and look alike. But their meanings and usage do not always coincide. Dictionary equivalents for some objectives and modifiers used with nouns and verbs respectively do not always correspond to good English expressions of such phrases, The style of the scientific and technical literature of Russian is not the same as that of English. Very often in translations the English is not fluent, though translation is grammatically and technically correct. This is because one has a tendency while translating to concentrate only on the accurate rendering of individual sentences, and does not pay attention to the preceding or the following sentences. For smooth and easy reading of the translation, one should pay attention to the logical connection of sentences and the sequence of ideas in the original. The relationship of ideas in a sentence and their continuity from sentence to sentence should be stated directly in a straightforward way; their discernment should not be a matter of intellectual exercise or discovery after some mental labour by the reader. No more effort should be needed to understand a translated passage than its subject matter itself calls for. Another point which hinders readability is the inconsistent or non-uniform translation of identical terms in the original. Failure to recognise inversions and the inability to understand the actual role of connectives in concrete sentences lead to distortions in emphasis. There are also major sources of stylistic deficiencies in translations. Some of them relate to the form used in communicating the content of the original and stem from the interaction of contrastive elements in the source and target languages, and they have to be consciously understood if consistent, good translations are desired. There are sources of formal deficiencies in communication which even a person to whom the language is native may not be free from proneness to produce. The responsibility for improving a translation in regard to this second category of deficiences is strictly the job of a language editor rather than of a translation editor. A translation, to be usable, should not only be readable but also intelligible.

Intelligibility

Translation should not be free,this means that there should not be use of terms which are more general than those used in the Russian original. For specific Russian words, specific term in English should be used; if necessary, explanatory footnotes should be provided. By free use of terms, the information level of the translation is reduced and intelligibility marred. The translation should not be free to the point of omission of information in the original text. A Russian technical term should Different Russian terms which may have identical English equivalents should be transla- be translated the same way each time it is repeated. Otherwise. clarity will suffer. ted differently to distinguish them if possible. At the same time actual synonymous use of different words should be recognised and such words should be identically rendered. Uncertainties of the translator should be resolved invariably by appropriate footnotes. No new terminology should be coined without making sure that a term exists that for the concept in question. Consistency in terminology should be consciously achieved even if the original is guilty in this respect. Terminology used should be that in current vogue. There should be no ambiguities in the translation. It is possible that ambiguities are introduced in the translation, even though the original may be free of them. This happens particularly when the referents of demonstrative relative and personal pronouns are not understood. Certain compressed phrases of the original will have to be amplified to make the translation intelligible. Ambiguities in translations sometimes result from literal translations, which show only the grammatical relationship of words and clauses and not their semantic connections. Too much verbiage and repetition which is preserved in literal translation also prevent intelligibility. Abbreviations introduced for convenience as well as those used to refer to Russian institutes, commissions etc., should be defined the first time they are used. Ambiguities inherent in the original which the translator is unable to resolve should be marke marked for the attention of the subject or translation editor as the case may be.

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FOCUS ON UNISIST PROGRAMMES

This is the second instalment of this Feature. The items reported here have been taken from UNISIST Newsletter no. 3 and no. 4. A write-up on UNISIST has been given along with the previous instalment

WORLD MACHINE-READABLE INVENTORY OF ABSTRACTING AND INDEXING SERVICES.

One of the long-term objectives of the UNISIST programme is the establishment of a world network of interconnected referral services for the purposes of:

(a) allowing users to switch to the most appropriate services, according to their particular needs;

(b) analysing the characteristics of existing information services with respect to coverage, subject categorization, cost policies, etc. so as to increase the knowledge of primary and secondary sources of information;

(c) detecting 'anomalies' in the world-wide distribution of analytical work.

... The following guides published by the FID and the NFAIS were used to build the initial working data base:

1. Abstracting Services, 2v. 1969.
2. A guide to the world's abstracting and indexing services in science and technology 1963.
3. Index Bibliographicus, 2v. 1964.

The outline of the project is:

To merge and update data already contained in the published directories.

To collect current data on indexing services in science, technology, the social science and the humanities.

To compile the data in machine-readable form and develop machine programmes that provide for printing the file, periodic updating and demand searching.

To publish a revised directory of abstracting and indexing services to be undertaken jointly by the two Federations (FID and NFAIS) three years from the start of the project.

To design the file structure in an "open-ended" form so that additional information can be added to any segment or subset of the file.

To establish agreed procedures to update and maintain the data base after the funded project is completed.

In developing the plans for the inventory it was agreed that services produced informats other than printed (e. g. microfilm, computer tape etc.) should be included....

It is expected that the final Master File of the machine-readable inventory will be completed by late 1974.

UNISIST WORKING GROUP ON BIBLIOGRAPHIC DATA INTERCHANGE, 1st Meeting 21-22 May 1973.

The Group had been created with the aim of developing recommendations to facilitate the interchange of bibliographic data in a compatible form among all types of users and producers and for all types of bibliographic material. It was stressed that the Group would be concerned with both the content and format of bibliographic data element in both mechanized and manual systems....

... The Group felt it necessary, as a first step, to conduct a study of existing standards and systems utilizing standards, defining and analysing areas of compatibility and incompatibility and to identify in it areas which lack standardization and which could be considered as candidate for international standardization. Areas where the activities of libraries and information services overlap were considered particularly important.

The following standards and systems were to be studied and evaluated as far as their scope, limits, functions and concepts are concerned: ISBD (M), ISBD (S), the Reference Manual, ISDS Guidelines, the MARC family, INIS, AGRIS, ISIS and EUDISED. The comparative analysis should take into account four levels of bibliographic data interchange standards:

(a) generalised record formats
(b) tagging structure of data elements
(c) definition of data element content
(d) standards of general application (e. g. transliteration, country code, etc.)

It is, however, expected that it will concentrate on (b) and (c).

REGIONAL INFORMATION NETWORK FOR SCIENCE AND TECHNOLOGY FOR SOUTH EAST ASIA.

Within the framework of the programme objective for assistance to developing countries and with the financial assistance of UNDP, a project for the establishment of a Regional Information Network for Science and Technology for South East Asia will be initiated by two consultants beginning July 1973. The countries co-operating in this project are: Indonesia, Malaysia, Philippines, Singapore, Thailand, and Hong Kong. Australia, Korea and Japan will also be visited by the mission to look into the possible future involvement of these countries in the regional effort.

The long-range objective of the project is to assist the countries concerned in improving. The transfer of the world scientific and technical information by establishing a regional network, composed essentially of national information centres, or focal points linked together for the rapid exchange of scientific and technical information and documents.....

The immediate objective of the project... is (a) to assist the participating countries in establishing, reorganizing or reinforcing their national information systems and introducing at the national level the necessary measures that will facilitate their future interconnection; (b) design a detailed programme of action for the gradual evolution of the network; and (c) investigate sources for future funding.

The project, in its complexity, represents a pioneering effort in regional co-operation in scientific and technical information.

UNISIST MANUAL FOR THE EDUCATION AND TRAINING OF USERS OF SCIENTIFIC AND TECHNICAL INFORMATION.

This Manual, which is conceived as a guide to teachers and information specialists responsible for organizing and running courses, seminars or workshops in developing countries, will serve as a basis for organizing programmes for the education and training of users of scientific and technical information-both in the form of a basic education course for students at the university level and as a training workshop for practitioners.....

A contract was signed with Professor A. Evans (United Kingdom), President of the International Association of Technical University Libraries (IATUL) to act as Chief Editor. He will be assisted on the one hand by an International Advisory Group composed of members from developing countries as well as experienced experts in the training of users, and on the other hand by staff of the University of Technology, Loughborough, and more particularly by Mr. R. G. Rhodes of the same institution....

Subject to the approval by the General Conference of Unesco at its eighteenth session, future plans call for a pilot workshop test early in 1975 in at least one developing country, using the draft Manual. Taking into account the experience gained in running the pilot workshop test, the manuscript will be completed in 1975 and the Manual subsequently published. The English language edition will be followed by editions in French and Spanish.

PLAN FOR THE HARMONIZATION AND PROMOTION OF INTERNATIONAL ASSISTANCE PROGRAMMES IN TRAINING AND EDUCATION IN THE FIELD OF SCIENTIFIC AND TECHNICAL INFORMATION AND DOCUMENTATION.

UNISIST has been called upon to undertake the promotion of co-ordination of international technical assistance efforts in training and documentation in the field of scientific and technical information and documentation for developing countries....

As a first step towards the development of this co-ordinating plan, a draft outline of a study, which may later serve as a basis for action within the UNISIST programme, was prepared under contract with Unesco. This draft outline defines the main purpose of the plan, throws light on the different problems which will have to be considered when preparing such an overall plan for harmonization, summarises the activities which will have to be undertaken- (e. g. creation and maintenance of a "focus" to collect and disseminate information about assistance programmes; quantitative study of the need for educational assistance for the next two years)- and enumerates the existing activities in the field of assistance in training and education for which harmonization is needed...

This work is being carried out by Professor A. S. Douglas, Vice-President of the International Federation for Information Processing (IFIP).

INDEXING IN PERSPECTIVE SEMINAR.

... Since 1969 the National Federation of Abstracting and Indexing Services (NFAIS) has been organizing three-day seminars on indexing which have been held in many places in the United States. It was decided to use the rich experience of the Federation in organizing a similar seminar in Europe, [which was held in London, from 27 to 29 June in the premises of INSPEC]...

The documentation and experience of the seminar will be considered within the UNISIST programme as a model for further developing a co-operative programme of continuing education in indexing, especially for developing countries.

UNISIST WORKING GROUP ON PRIMARY SOURCES OF INFORMATION.

The UNISIST Working Group on Primary Sources of Information held its first meeting on 18-19 June 1973 in Unesco House.

The Group has been created as a follow-up of the second meeting of the UNISIST Working Group on Systems Interconnexion with the aim of undertaking appropriate measures in order to harmonize the presentation of information in primary sources. These measures have to increase the quality and uniformity of primary publications and thus facilitate the users' access, users being in this case scientists and engineers, as well as compilers of abstracting and indexing services.

The terms of reference of the Working Group were defined as follows: (a) identify the types of primary documents; (b) identify existing guidelines or standards relevant to primary documents as well as the gaps where standardization could be initiated under UNISIST auspices; (c) propose further programme of action including nomination of of persons and institutions that could undertake specific work, such as preparation of specific guidelines, etc.

It is supposed that the guidelines thus established will be included in the UNISIST Manual for Systems Interconnexion and further forwarded to ISO to become international recommendations. It was stressed that the working Group should base its activities on already existing international and national recommendations and guides covering the field of primary publications...

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP) PROJECTS WITHIN THE UNISIST PROGRAMME

In co-operation with the United Nations Development Programme (UNDP), Unesco, as the Executing Agency, is responsible for implementing in its Member States various projects, partly financed by UNDP, in the fields of education, science, culture and communication. Of these projects which fall within the competence of the Unesco Science Sector, the Division of Scientific and Technological Documentation (STID) has been assigned projects relating to the UNISIST programme in the following countries: Colombia, Indonesia, Ivory Coast, Korea, Bulgaria and in two regions: South East Asia and the Andean region of Latin America...

Colombia- Establishment of a National Information System (SNI). The project aims at the creation of National Information System (SNI) which will link existing libraries and documentation centres and thus provide for the transfer of information to a larger number of potenial users (e. g. scientists, teachers, students, government specialists and entrepreneurs, etc.) with up-to-date information from national and international information sources....

Indonesia- Network of Scientific Information and Documentation. With the co-operation of the National Scientific Documentation Centre (PDIN) of the Indonesian Institute of Sciences (LIPI), the long-range objective of the project is to develop a National Network of Scientific Information and Documentation which can effectively supply scientists and engineers with available up-to-date information from world information resources.

The immediate objectives of the project are to (a) assist in the formulation of a national scientific information policy; (b) to assist in strengthening PDIN so that it can function as co-ordinating body for the network; (c) to identify needs and potential of Bibliotheca Bogorienses in Bogor as the centre for Biology and agriculture.....

Ivory Coast- Establishment of a Scientific Documentation Centre (CNDS). The long-term objective of the project is, in the first stage, to define the national information policy and establish the National Centre of Scientific Documentation; the second stage foresees CNDS as becoming operational and thus providing a means of access to scientific and technical information for research in the Ivory Coast...

Korea- Equipment assistance of the scientific and technological, information activities at the Korea Scientific and Technological Information Centre (KORSTIC).

The assistance provided is for the establishment of a mechanized information retrieval system which will permit an increase in the effectiveness of the centre which, to dat, has based its work on manual methods.

The long-range objectives of this project are: (a) to create markets and stimulate the use of information in Kored; (b) to provide satisfactory information service to information users; (c) to support the development of science and technology.

The immediate objective of this project is to perform information activities more efficiently with introduction of information retrieval machines and printing equipment and provide prompt and relevant information on patent and scientific literature.

Bulgaria- Science, information and documentation.....

The long-term objective of the project is the acquisition of "know-how" of technological processes involved in the production of micro-fiches and their use for the needs of scientific information and documentation.

The immediate objectives include (a) use of micro-fiches in the automation of the information process at the Centre for Information and Documentation of the Agricultural Academy of Sofia; (b) acquiring knowledge on the functioning of the equipment for the production of micro-fiches.

LATIN AMERICA-ANDEAN REGION: SCIENCE POLICY AND SCIENTIFIC AND TECHNICAL INFORMATION IN THE CARTAGENA AGREEMENT COUNTRIES-PREPARATORY ASSISTANCE MISSION.

Within the framework of the UNISIST programme for assistance to developing countries and with the financial assistance of UNDP, this project aims at establishing a Network of Natinal Scientific and Technical Information Centres for the Transfer and Diffusion of Information in Science and Technology for the countries of the "Convenio Andre's Bello". As a first step towards the implementation of this project a Preparatory Assistance Mission composed of an expert in scientific and technical information and documentation and one expert in science policy will visit the Andean Region... to prepare the final project document. The countries to be visited by the mission are: Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela....

A UNESCO INTERNATIONAL INFORMATION SYSTEM FOR SCIENCE AND TECHNOLOGY POLICY.

This Unesco programme was launched in 1969. It is planned to complete and publish in 1974 a Feasibility. Study on the establishment of an International Information System for Science and Technology Policies within the framework of, and compatible with UNISIST.

The Feasibility Study will comprise: the results of (i) a "Market Study" on the demand for creating, and ways of setting up such a system; (ii) a survey of the average amount of literature produced per annum in the field of science and technology policies: some 3,000 abstracts resulting from the 1972-73 experimental indexing of literature in the area of science and technology policies; the source (English) version of a "Thesaurus" on science and technology policies; a provisional world list of periodicals dealing regularly or occasionally with science and technology policies; analysis of the managerial, financial, technical, etc. implications of different alternatives for establishing the Unesco World Information System for Science and Technology policies....

THE ISDS TECHNICAL ADVISORY COMMITTEE, 2nd Meeting... technical points of discussions, were:

1. Present status of the system: It was suggested by the Technical Advisory Committee that the International Centre should contact all Member States who had shown interest in the establishment of an ISDS Centre. It was also recommended that the International Centre should make a special effort to ensure the support of countries that are major producers of serials...

2. Progress of the International File:The International File will be developed from three kinds of input:

(a) Machine-readable files provided by indexing and abstracting services and libraries (basic-file). The files now being processed are CASSI, CODEN and the CNRS file... The Technical Advisory Committee discussed the main proposals concerning the establishment of the basic file, namely, key titles, transliteration and merging.

(b) Machine-readable input from national centres. As tapes from ISDS national centres will be in ISDS format, they will be stored separately. They will be incorporated into the basic file when the latter is ready to be numbered.

(c) Work-sheets established by national centres and the International Centre. The worksheets are stored at present at the International Centre. They will be processed monthly and merged with the tapes from national centres.

3. Regular communication between national centres and the International Centre is defined in the Guidelines for ISDS. Special requirements will be considered in the agreement signed by the International Centre with each new national centre and in subsequent bilateral discussions. It was suggested that a standard ISDS work-sheet should be used for all communication of "manual" data. This standard work-sheet will also be the only means of information exchange with some national centres...

FIRST REGIONAL CENTRE FOR ISDS.

At its 7th session in July 1973, the Committee of Plenipotentiary Representatives of the Member States of the International Centre for Scientific and Technical Information (IOSTI) in Moscow decided to create a Regional Centre for the International Serials Data System.

The Regional ISDS Centre which is to be located within ICSTI in Moscow, will represent the following countries: Bulgaria, Hungary, German Democratic Republic, Cuba, Mongolia, Poland, USSR and Czechoslovakia.

The centre will assure the centralized input of information to ISDS from the countries mentioned above, while the distribution of ISDS servies may be either decentralised or channelled through ICSTI.....

BOOK REVIEW

Canadian MARC; a report of the activities of the MARC Task Group resulting in a recommended Canadian MARC format for monographs and a Canadian MARC format for serials. Ottawa, National Library of Canada, 1972. x + 242p. (Reviewed by A. Krishnan)

The MARC has made a mark in documentation service and the presentation of "Canadian MARC" report is to be welcomed. In view of the difficult foreign exchange position, and limited hardware facilities, India has not been able to make much use of the available MARC tapes for documentation service. But the capability or alertness to utilise such advanced technology, given the necessary resources, cannot be denied.

The Canadian Mark Task Group laboured for nearly a year to produce the above report. It operated through six subgroups and "a great deal of work has been done in order to be able to recommend a MARC format for monographs and one for serials to the National Librarian". The result includes comparative tables of MARC formats of USA LC MARC II, U K (PRECIS), French (MONOCLE), and Italian extending over 146 pages out of 242 pages of the report.

Being next door northern neighbour to U. S. A., Canadian MARC follows the lead of Library of Congress MARC, "Evidence of a common North American bibliographic method is heavily supported in general" and "Canadian library community relies heavily on Library of Congress for answering its bibliographic needs in the traditional way as well as in machine-readable form" are statements which express the philosophy behind the report. However, it should be accepted that the report synthesises from others whatever is best for Canada. Special provisions have been made to solve the bilingual problem of Canada.

International exchange of machine readable records will be the problem of future and this could be reduced by having some agreed formats applicable to all countries. In this Context Duchesne's Concept of 'SUPERMARC' format is to be developed and implemented as an urgent project.

The conversion of the catalogue into machine readable form, edited by A.E. Jeffreys. Newcastle upon Tyne, Oriel Press, 1972. vi, 95p. £ 2.85. ISBN 085362 145 4 [Reviewed by B. Guha].

The publication is the first phase report of an interesting study into the problems of converting the card catalogue of the University of Newcastle upon Tyne. The project was supported, from 1967 to 1970 by the Office of Scientific and Technical Information (OSTI). The first part of the project was devoted entirely to the problems of conversion of the catalogue. The second part of it was devoted to studies of catalogue use.

The Catalogue Computerisation Project (CCP), as it is officially named, was undertaken in the belief that computer technology will play an increasingly important part in the operations of libraries. This was made amply clear by the Dainton report also. The Newcastle catalogue was selected for this experiment because of its ideal size which comes in the middle of the range of British university libraries. Further, the University had gained considerable experience in the computer handling of bibliographic information.

The present report gives quite a detailed account of the processing, size of the job, problems involved together with the costs of the various stages of the project. It has also highlighted some points as conclusions of the study. The CCP had to deal with the basic data of 260,000 main entries, 12,340 general references and 5,200 guide cards of the catalogue. This involved nearly 70 million keystrokes with an average of 267 keystrokes per main entry. The total keypunching costs was £6,146 with an average of 2.4p. per main entry. The total cost after editing, computer processing and adding the salaries of project staff, costs of magnetic tapes, paper, etc. worked out to £29,417.41. This meant an overall unit cost of 11.3p. per main entry.

About half of the report is devoted to Appendices, wherein details of record structures, instructions to punchers, extracts of different programmes, examples of output, etc. are provided. The computer used was an English Electric (now ICL) KDF9, a zero address machine with 16K 48-bit words of core, four magnetic tape drives, a fast line printer with a limited character set (upper case only), two paper tape readers and a punch. Later on a second machine, an IBM 360/67, was added to the hardware.

At a time when more and more libraries are getting involved in the application of computer techniques, especially in the preparation and maintenance of the 'white elephant' i.e. the catalogue, this report will be a valuable guide.

Statement about

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I, V. Ramachandran, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dated 5.10.1974

Sd. V. Ramachandran

Signature of Publisher

INDIAN NATIONAL
SCIENTIFIC DOCUMENTATION CENTRE

The Centre has been established by the Government of India with the help of UNESCO to serve as a vehicle for the procurement, exchange, and dissemination of scientific information required by the Indian scientist engaged in research and development. Its operation has been entrusted to the Council of Scientific and Industrial Research.

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WORK DONE IN INDIA ON VIRAL AND RICKETTSIAL INFECTIONS OF VERTEBRATES – A BIBLIOGRAPHY U.S.A. $ 30.00 and other countries £10	Rs.50.00
DIRECTORY OF INDIAN SCIENTIFIC PERIODICALS, 1968 U.S.A. $ 3.00 and other countries £1	Rs.10.00
DIRECTORY OF SCIENTIFIC RESEARCH INSTITUTIONS IN INDIA, 1969 U.S.A. $ 30.00 and other countries £10	Rs.75.00

COVER TO COVER TRANSLATED PERIODICALS

Transactions of the Academy of Sciences of the Ukranian SSR Ser A. Physico-Technical and Mathematical Sciences Translation from Dopavidi Akademii Nauk Ukrainskoi SSR. Monthly 1970 - Annual subscription U.S.A. $ 40.00 and other countries £12.50	Rs.100.00
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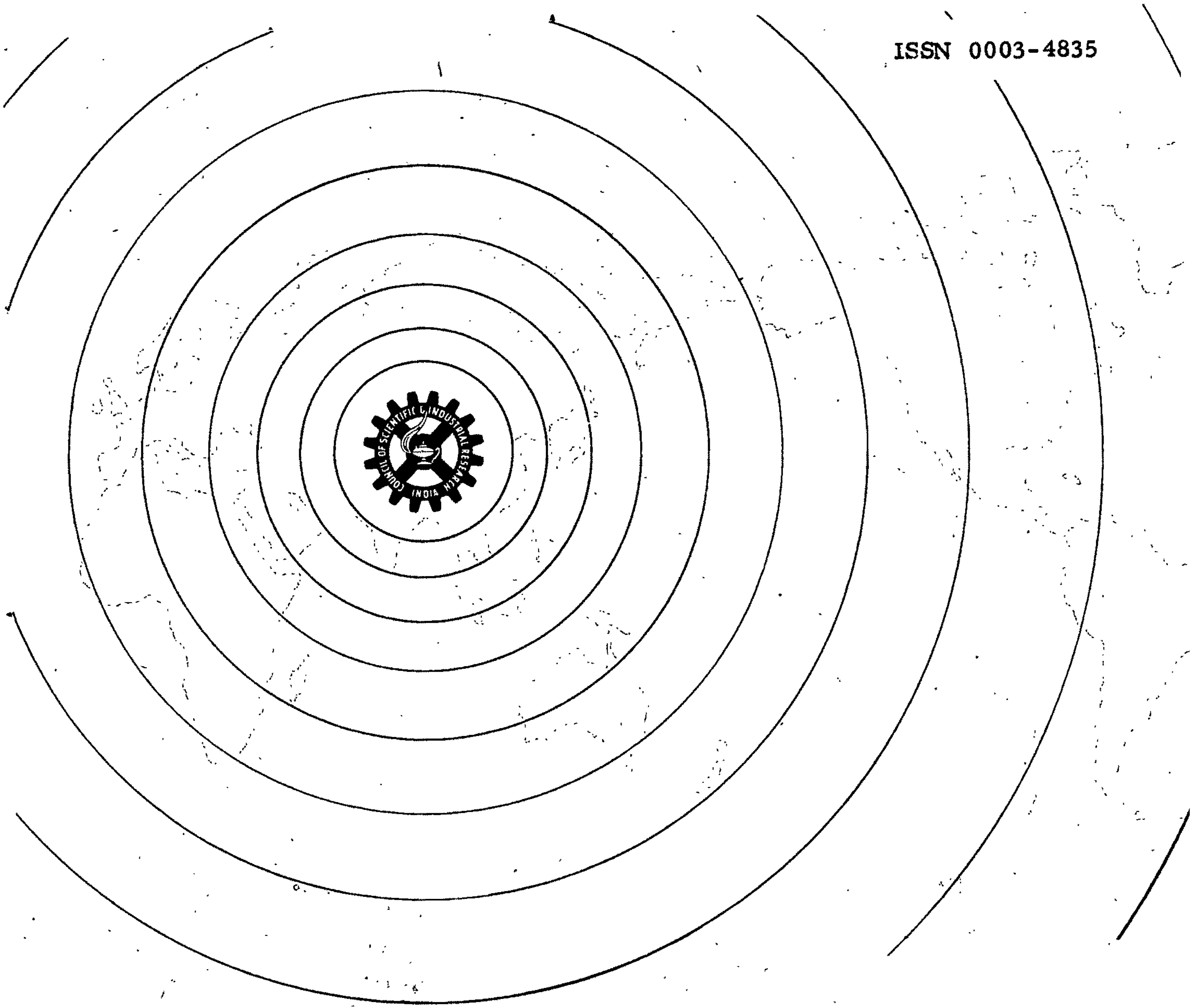

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PROCESSING OF UNION CATALOGUE OF SERIALS DATA USING AN IBM SYSTEM/360 COMPUTER

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Describes an experiment for the computerised preparation of a union catalogue of serials of 8000 titles in 66 libraries. Gives the card designs, programs and formats of different files viz., Main File, Holdings File, Sponsor Index File, Subject Index File etc. A system flow chart is also given.

Introduction

Union Catalogue (UC) is an indispensable reference tool for librarians as well as for researchers in finding out the essential details of a serial alongwith the holdings information i.e., in which libraries it is being received and which volume/numbers are available in these libraries. Thus it contains the information about various serials in two or more libraries either in a region, country, etc. Realising the importance of this tool, Insdoc took up the National Union Catalogue Project (NUCP) as far back as 1965 and brought out 12 volumes of Regional Union Catalogues and individual library catalogues by conventional methods.

It has been felt that the various aspects of this project viz., merging, updating, bringing out the hard copy as well as the broad subject group catalogue, the holdings list of individual libraries, and the ultimate printing of the catalogue could be profitably mechanized. Properly organized and coded entries for different regions once stored in machine-readable data base, can be manipulated to generate any desired file and produce printouts.

In this paper a description of such an experiment using an IBM System/360 Model 44 computer is given whose objectives ars: i) to generate the data base of information of scientific serials held in major libraries; ii) to make use of the data to produce Regional Catalogues expeditiously; iii) to generate subfiles to produce the classified, sponsor, country-wise indexes, individual library holdings, holdings of groups of specialised libraries etc., and iv) to update the data base from time to time.

The Union Catalogue of Serials (UCOS) for Bombay-Poona containing the information of about 8000 serials in 66 libraries, has been brought out with the help of S/360 Model 44 (2540 card Read Punch, 1403 printer, 2311 - Three disk drives, and three 2401 V. tape drives with 128 K memory), using Fortran IV under the operating system (OS). This catalogue consists of a Main Part (MP) supported by three indexes viz. Classified, Sponsor, and Place (at present place index is not published).

Statistical Information

Testing and developing the programs have taken about 20 hours of computer time. About 6 hours of computer time were used to get the listing of data cards for final editing, and another 25 hours of computer time were required for loading, generating the index files, printing of the MP and the indexes. About 3500 man hours were spent for coding the data to prepare the input for computer processing and about 4000 man hours for punching and verification of about 1, 00, 000 punched cards. The break up of computer time is as follows:

Loading the Main File (MF) (about 60000 cards)	5 hr
Loading the Holdings File (HF) (about 30000 cards)	3 hr
Splitting the MF	1.30 hr
Sorting and merging the MF	25 mts
Sorting HF	15 mts
Printing of MP	3 hr
Generation of Sponsor file (SPF), subject file (SBF), and place file (PF)	5.15 hr

Modifying the SPF, generating the subject Dictionary (SD) and sorting SD	20 mts
Sorting of the above files	45 mts.
Printing of the three indexes, viz. classified, sponsor and place	5.15 hr.

Card Designs

Keeping in view the objectives of computerization of the project, the input has been prepared according to the following card designs (CD):

CARD DESIGN NO. 41

SUMMARY CARD

Sl. No.	Item	No. of characters	Column no.
1	2	3	4
1	Card Design No. 41	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Title code (TC)	7	9-15
5	Place code (PC)	3	16-18
6	Subject code (SBC)	6	19-24
7	Main entry or cross reference entry Main entry 1 CR Entry 2	1	25
8	Whether cross reference entry is to appear in index Yes 1 No 2	1	26
9	Whether sponsor absent/present with title/not present with title Present with title 1 Not present with title 2 Absent 3	1	27
10	If sponsor not present with title, then no. of sponsors in Main part One 1 Two 2	1	28
11	If sponsor not present with title then whether sponsors appearing in Main Part the same as those appearing in Index Yes 1 No 2	1	29
12	No. of sponsors in index One 1 Two 2 Absent 3	1	30
13	Whether bibliographical note present Yes 1 No 2	1	31
14	Whether the entry is a current one or not Current 1 Ceased 2	1	34

CARD DESIGN NO. 42

TITLE CARD

Sl. No.	Item	No. of characters	Column no.
1	Card Design No. 42	2	1- 2
2	Coder's code	2	3- 4
3	Serial No.	4	5- 8
4	Title Code	7	9-15
5	Blank	7	16-22
6	Title	Var (28+28)	23-50 51-78
7	Serial Number (Sl. No.) of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 43

TITLE OF A CROSS REFERENCE (CR) ENTRY

1	Card Design 43	2	1- 2
2	Coder's code	2	3- 4
3	Serial No.	4	5- 8
4	CR Title Code	7	9-15
5	CR Entry	Var (28+28)	23-50 51-78
6	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 44

FIRST SPONSOR APPEARING IN MAIN PART

1	Card Design No. 44	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Title Code	7	9-15
5	Sponsor Code (SPC)	6	16-21
6	Blank	1	22
7	Sponsor	Var (28+28)	23-50 51-78
8	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

Card Designs No. 45 for second sponsor, No. 46 for first sponsor appearing in index, and No. 47 for second sponsor appearing in index are same as that of Card Design 44.

CARD DESIGN NO. 48

IMPRINT

1	Card Design No. 48	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Title Code	7	9-15
5	Blank	7	16-22
6	Imprint	Var (28+28)	23-50 51-78
7	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 49

BIBLIOGRAPHICAL NOTE

1	Card Design No. 49	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Title Code	7	9-15
5	Blank	7	16-22
6	Bibliographical Note	Var (28+28)	23-50 51-73
7	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 50

HOLDINGS INFORMATION

1	Card Design No. 50	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8

4	Library Code (LC)	6	9-14
5	Title Code	7	15-21
6	Whether holdings complete or partial Complete 1 Partial 2 Stray 3	1	22
7	Holdings Information	Var (20+20)	23-42 43-62
8	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 52

CROSS REFERENCE TO SPONSORING BODY INDEX

1	Card Design No. 52	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Code of CR Body	6	9-14
5	Blank	8	15-22
6	Name of CR sponsoring body together with Main Body	Var (28+28)	23-50 51-78
7	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 53

SUBJECT DICTIONARY

1	Card Design No. 53	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Subject Code	6	9-14
5	Blank	8	15-22
6	UDC Class No. together with heading (with a blank in between UDC Class No. and heading)	Var (28+28)	23-50 51-78
7	Sl. No. of card if another card is to follow, otherwise 9 (0-9)	1	80

CARD DESIGN NO. 54

PLACE DICTIONARY

1	Card Design No. 54	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Place Code	3	9-11
5	Blank	11	12-22
6	Place Name	Var (28+28)	23-50 51-78

CARD DESIGN NO. 55

CROSS REFERENCE ENTRY TO INDIVIDUAL LIBRARY FILE

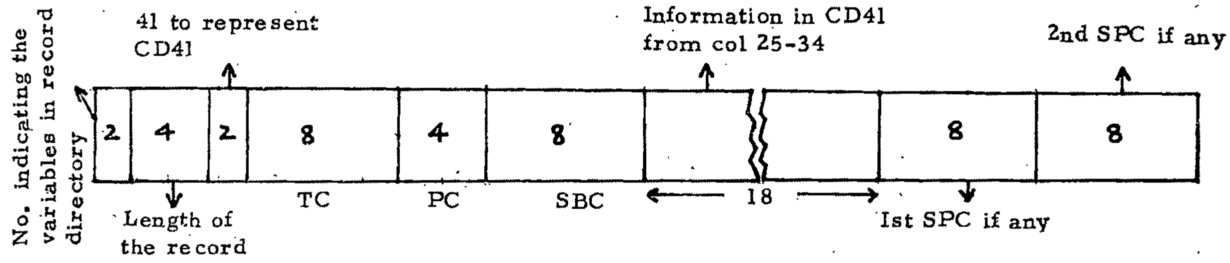
1	Card Design No. 55	2	1- 2
2	Coder's Code	2	3- 4
3	Serial No.	4	5- 8
4	Library Code	6	9-14
5	CR Code	7	15-21
6	CR-Entry (Code 4)	1	22

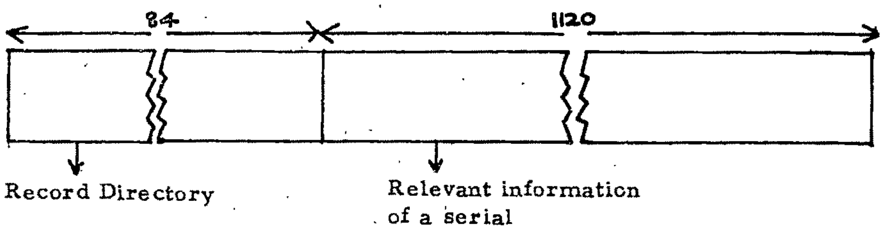
Details of Programs

All the programs in this project are written in Fortran IV. The files have been created with a fixed length blocked record (FLBR) format. Details of the various programs of this project are described below.

Program for generation of the Main File (MUCSG)

MUCSG generates the Main File (MF) on tape, the length of each record being 1266 bytes with a blocksize of 12660 bytes. The Card input coded according to the design 41-49 is used by this program to create the MF. It reads the first card of the record, checks for CD41. If the first card of the record is not CD41 appropriate messages are printed, in which case the whole record is skipped and reading of the cards belonging to the next record is proceeded; if first card is CD41 it reads the rest of the cards belonging to the same record and checks whether all the CDs are present for that record according to the control information given in the CD41. If it is not so, then error messages are printed after which first card of the next record is read with the necessary skipping. The program also checks whether all the cards belonging to the same record have the same TC, cards of the sponsor body extending to more than one card have the same SPC, and all the cards of various CD are in sequence, failing which error messages are given again. The error messages, enable to find out the possible discrepancies in the coding or punching. All such records are added to the MF after suitable correction at a later date. For each record the program calculates the total length of the record, the starting addresses and lengths of corresponding elements e.g., title, sponsor body, imprint, bibliographical note etc. The tape format of the record is shown schematically below (all lengths being given in bytes):

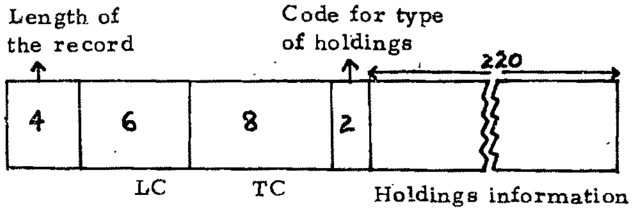




Program to Generate the Holdings File (HUCS)

HUCS generates the Hold file (HF) on tape with a record length of 244 bytes and blocking factor of 20.

This program reads CD50 and checks the squence of cards. If the record runs to more than two cards, and if the cards are out of sequence, appropriate error messages are printed and the next record is read. Otherwise, it reads cards pertaining to one record and writes on the tape. The special characters contained in the records of this file e.g., plus sign, left and right parenthesis etc. have been punched in the BCD code and were subsequently converted to EBCDIC through this program while loading on the tape. In the data preparation stage, an IBM 024 punching machine was also used. Also the verification was carried out on an IBM 056 machine. Therefore, this procedure of conversion to EBCDIC is adopted so as to increase the efficiency in the punching and verifying operations. The record format in this file is as follows:



Program for printing the Main Part of the catalogue (MUCSP)

MUCSP prints the MP of the catalogue. Prerequisites for running this program are: i) the MF should be sorted on TC and ii) the HF on TC as the first control field (FCF) and LC as the second control field (SCF).

A record with a particular TC is read from the MF and all the holdings records corresponding to this TC are searched and the ME is printed. If the TC in the MF is not available in the HF, then the program prints an error message and prints the ME without holdings.

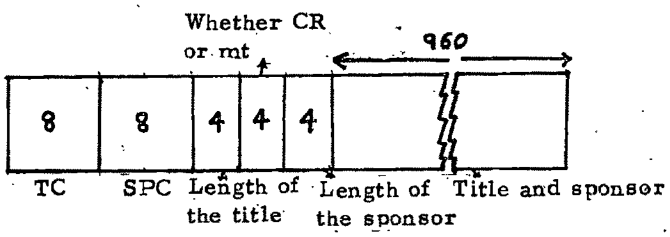
Print Format

Title code is printed on the first line of the ME in positions 22-28 (See Annexure), maximum width of a line being fixed as 30 characters. The title is printed leaving one line immediately after the TC in positions 1-28. Elements like sponsor, imprint, bibliographical note of the ME are printed in positions 3-30 giving two indentions. Name of the sponsoring bodies, imprint and bibliographical note are printed making use of the control information (as described in MUCSG program) of the record. If any element is not found in the record according to the control information then error messages are given. In the case of a CR entry, obviously the title alone is printed below the TC. One line is skipped before the printing of the holdings information in positions 3-30. If the holding information runs into more than one line, the subsequent lines are printed in positions 11-30 spreading into as many lines as required. Library symbols (LS) are printed in positions 3-8 and holdings information in positions 11-30.

Program to generate sponsor file and print the Sponsor Index (SUCSGP)

SUCSGP generates the sponsor file from MF with a record size of 988 bytes and a blocking factor of 10. This file is used to print the sponsor index (SPI). The program developed is a combined one (controlled by suitable switches) to generate the sponsor file from the MF and to print the sponsor index from the file thus generated.

While generating the sponsor file, this program reads the MF, checks whether a sponsor body is present or not. If present, another check is made as to whether it appears in the sponsor index in the same manner as it appears in the MF. Based on these checks the proper SPC and the sponsor body are written on the new file along with the title. If there are two sponsor bodies, two separate records are generated from the MF record. The format of the record in this file is shown below.



Some times the name of a sponsor body undergoes a change. In such a case a CR is made from this old to the new version of the name. The title is given under the latest name of the sponsor body. Thus the sponsor file consists of two types of records. The first type of the record is the one generated from the MF as explained above. The other is a CR sponsor entry added to the file through the CD52 by a separate program.

The sponsor file is sorted on the SPC as the FCF and TC as the SCF. The Sponsor index is printed from this file by the same program by using appropriate switches.

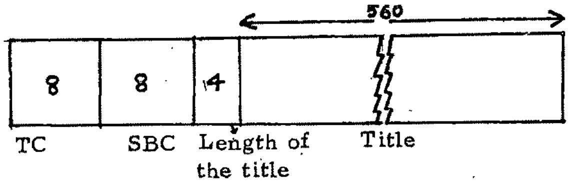
Under the name of one sponsor body, all titles are printed in the alphabetical order. Title is preceded by two hyphens in the first two positions. If title is running to more than one line, then the subsequent lines are printed in positions 1-28. The two hyphens given at the beginning of the title serve to locate the starting position of the title. Maximum length of a line is again kept as 30 characters. Between two sponsoring bodies a space of one line is given.

Program to generate subject file and print the Subject Index (CUCSGP)

CUCSGP generates the subject index (SBI) file from MF and also prints it (by means of switches). The records of this file have a length of 580 bytes with a blocking factor of 10.

It reads MF, extracts, and writes the SBC, TC and the title proper on a new tape.

The format of the record of the subject index file is as follows:



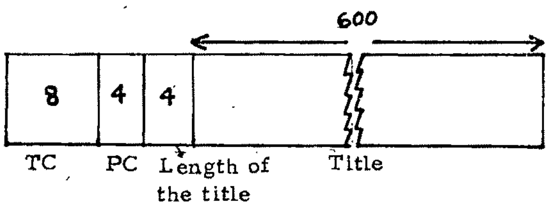
Subject Dictionary

Subject dictionary file is generation on a new tape by a separate program with a record length of 372 bytes and a blocking factor of 20.

CUCSGP, when used for printing subject index, reads a record from the subject file and gets the subject heading (SH) along with UDC number, from the subject dictionary. This program has a provision to print the SH along with UDC No. in bold (obtained by repeated printing on the same line) under which all the titles pertaining to it are printed in the alphabetical order. As in the case of the SPI, the starting position is preceded by two hyphens. The format of printing when the title exceeds 28 characters is also similar to SPI. In the case where the SBC of the record could not be located in the dictionary, the title is printed as usual leaving enough space to incorporate this missing SH manually later on.

Program to generate place file and print the Place Index (PUCSGP)

PUCSGP is a combined program to generate the place file (PF) from MF and to print the place index (PI). In this file, the record length is 616 bytes and the blocking factor is 10 having the following record format.



This file is sorted on PC as the FCF and TC as SCF. It reads the sorted place dictionary on cards through CD54 and stores it in the memory and prints the PI by suitable manipulation of the switches. The PI is brought out exactly in the same manner as that of the SBI.

Program to generate individual library catalogues (UCSILP)

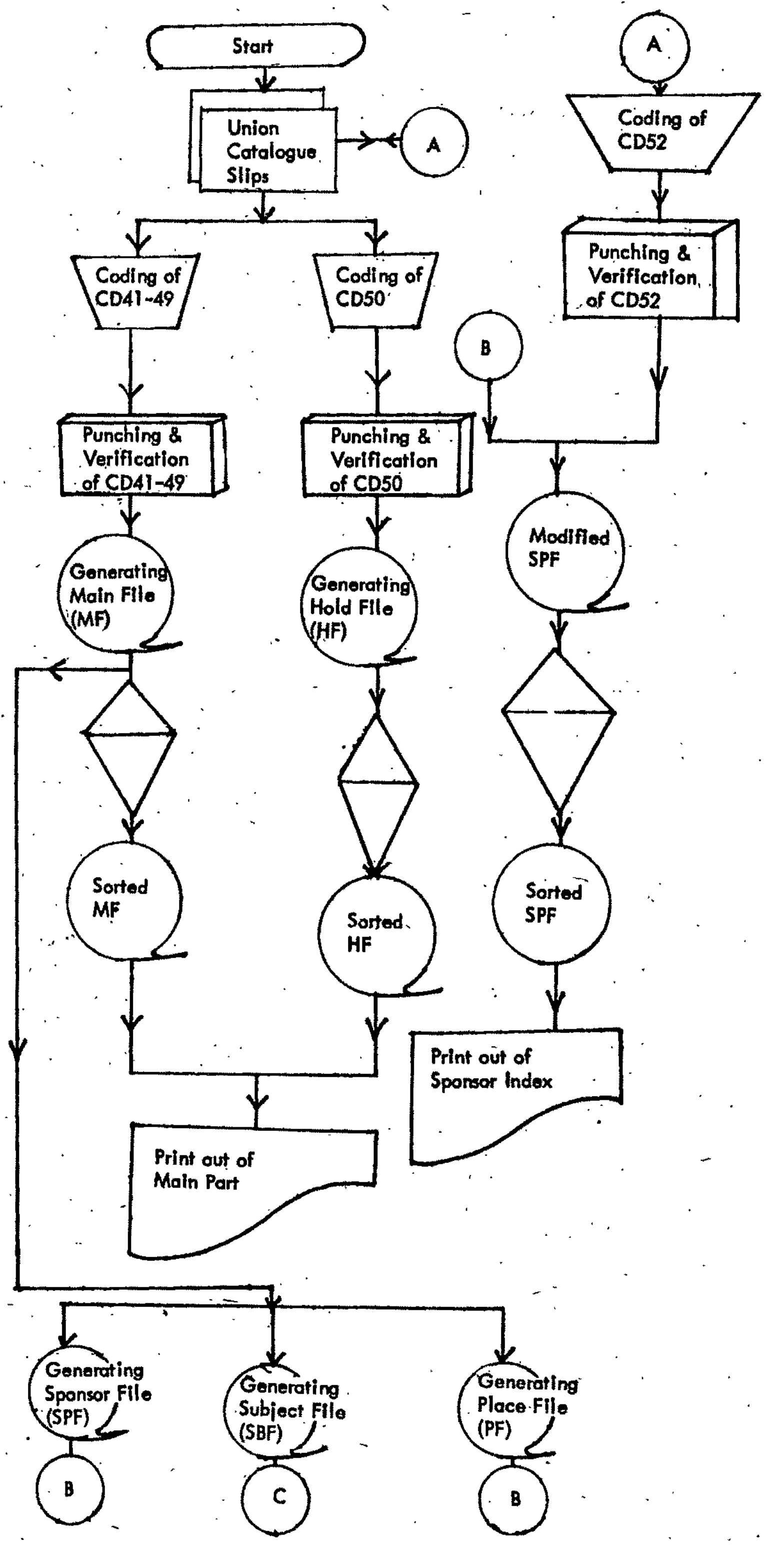
UCSILP brings out catalogues of individual libraries printing serials in the alphabetical order along with the holdings information.

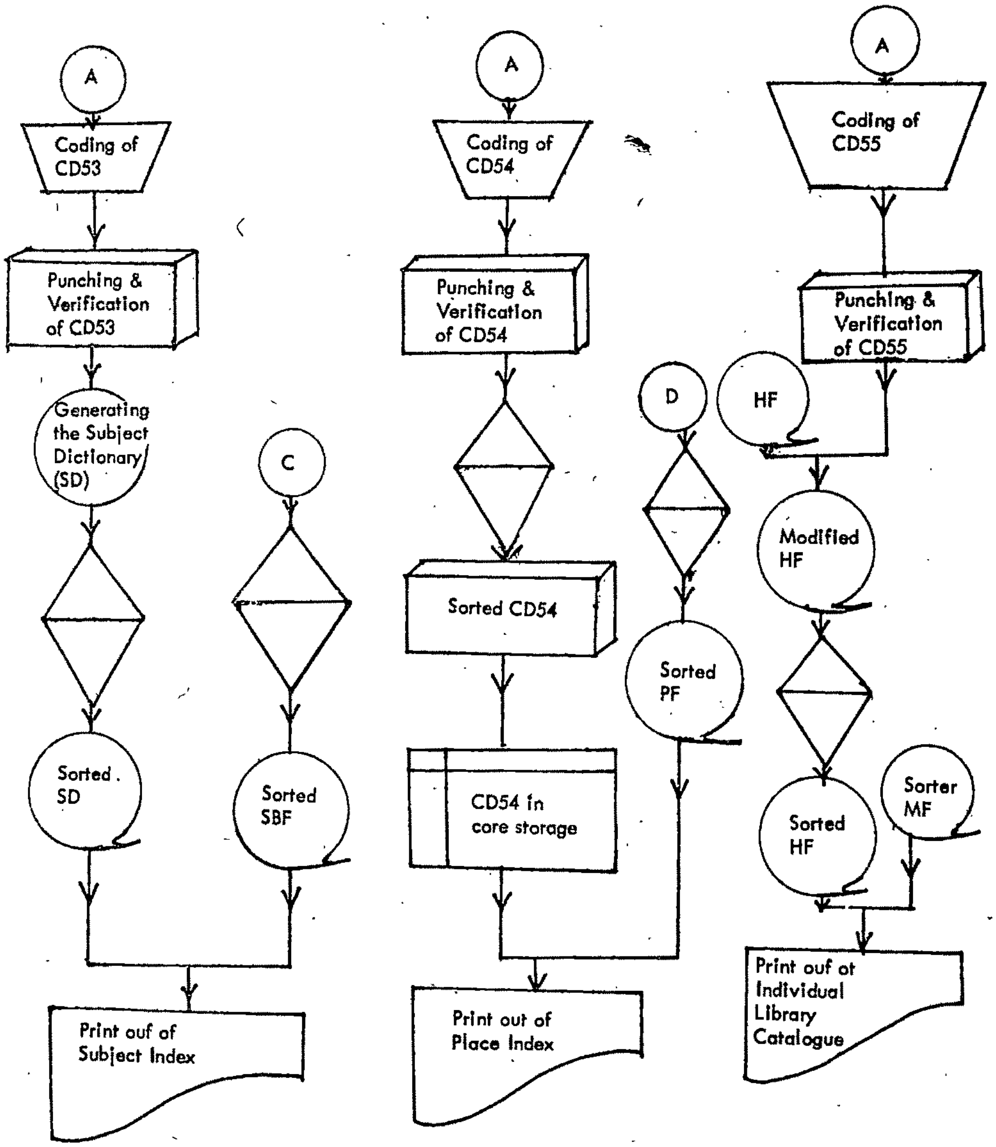
The HF is modified through CD55 by means of a separate program. This file is sorted on LC as the FCF and the TC as the SCF. The MF is sorted on TC.

UCSILP reads a given LC from the card, searches the HF for the particular library code; after finding the same it picks up the TC and scans the MF for the record having the same TC and prints the ME along with the holdings information. The format of printing is the same as that of MP. CR entry is printed as it is. In case a record pertaining to a TC is not found in the MF, appropriate messages are given. When the catalogue for a particular library is printed the MF tape is rewound, the next LC is read from the next card repeating the whole process as many times as required.

Discussion

Most of the fields of the records of the MF e.g. title, sponsor, bibliographical note etc., are of variable length. As the minimum and maximum lengths range from 50 to 1400 bytes, naturally an attempt was made to generate these files with a variable length record (VLR) format. Initially, the files were generated under the Programming System (PS) using Fortran IV. But under PS44 of S/360 i) records having more than 360 bytes are split up into more than one record each containing 360 bytes, and ii) IBM Sort/Merge program could not be used. In order to overcome these limitations all the operations like generation of the files, sorting were switched over to the Operating System (OS). Also at the time this project was taken up, unfortunately there was some trouble with the IBM Sort/Merge program with VLR format, as a result of which the files were to be generated with a fixed length record (FLR) format anticipating the maximum length in each file. The records were blocked to save time in generating, subsequent processing of the files, as well as in sorting. Thus the computer time mentioned in the estimates


Start
Union Catalogue Slips
A
Coding of CD41-49
Coding of CD50
Punching & Verification of CD41-49
Punching & Verification of CD50
Generating Main File (MF)
Generating Hold File (HF)
Sorted MF
Sorted HF
Print out of Main Part
A
Coding of CD52
Punching & Verification of CD52
B
Modified SPF
Sorted SPF
Print out of Sponsor Index
Generating Sponsor File (SPF)
Generating Subject File (SBF)
Generating Place File (PF)
B
C
B


A
Coding of CD53
Punching & Verification of CD53
Generating the Subject Dictionary (SD)
Sorted SD
C
Sorted SBF
Print ouf of Subject Index
A
Coding of CD54
Punching & Verification of CD54
Sorted CD54
CD54 in core storage
D
Sorted PF
Print out of Place Index
A
Coding of CD55
Punching & Verification of CD55
HF
Modified HF
Sorted HF
Sorter MF
Print ouf of Individual Library Catalogue

SYSTEM FLOWCHART

presented earlier includes the time spent in these various trials under both the operating systems and testing of the Sort/Merge program over a number of times under VLR format. In addition, lot of time was devoted at the time of loading with the 2540 card Reader due to off punching, discrepancy in the size of cards used etc.

In the case of sorting, particularly for the MF, enough work area could not be allotted on disk as the system used had a configuration having 3 disk drives and 3 tape units only. Thus the file is split up into 2 parts, sorted separately and then merged into one.

Concluding Comments

This experimental project comprising one region's data successfully showed that the UC can be brought out with a computer with the obvious advantage of building up a central machine-readable data base that yields the associated indexes viz., sponsor, subject, place from the MF by means of suitable programs.

Although VLR format can be tried in future as the data grows for minimizing the tape length, the experience of this project shows that FLR minimizes the processing as well as the sorting time.

In this type of project an important feature is the provision for updating the MF and HF. The MF needs updating or modification for i) correcting a record which contains some incorrect information while generating it; ii) when there is a change in the various components of an entry; and iii) when a serial ceases or changes its title and so on. The corresponding changes are to be effected in the holdings file also. In such updating operations, as it is not reliable to rewrite the record in the same position on the same tape, a fresh tape file will be created effecting the required changes. This, we feel, is inevitable for tape files.

The package programs developed will be used to generate the relevant files and print the individual catalogues of different regions after which a cumulated data base will be obtained by merging the individual files of these regions.

An attempt is being made to develop another package of programs for searching the HF and MF titlewise, librarywise, etc. They will be ultimately useful for on-line display about the availability of a particular serial in the country or to find out the group of serials in a specified subject or even more complicated logical searches.

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The authors are grateful to Shri S. Parthasarathy, Scientist-in-Charge, Insdoc, for kindly providing the necessary facilities and encouragement throughout the project and for permission to publish this paper. They are also grateful to Shri S. N. Dutta and his colleagues in the Union Catalogue Section for their constant guidance and useful discussions in connection with the project. Their thanks are also due to the staff of the Computer Centre, Delhi University for their kind cooperation during the project.

CHOOSING MICROBIOLOGY PERIODICALS: STUDY OF THE GROWTH OF LITERATURE IN THE FIELD

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Calcutta-32

An account of the growth and development of the subject Microbiology is presented followed by a study bringing out the important journals covering the subject. Taking the Annual Review of Microbiology, 1968-70, as source journal a ranked list of journals has been produced. Other aspects of the citation study (10408 citations) are also presented.

History of Microbiology

Microbiology is the branch of science dealing with the life cycle, physiology, nature, activity, structure, classification and distribution of micro-organisms, their technological applications and role in disease. The term micro-organisms is applied to some unicellular and structurally closely related simple representatives of the plant and animal kingdom, and are generally invisible to the naked eye and of dimensions between a fraction of a micron and 200 microns.

The first mention of the possibility that disease could be due to organisms too small to be seen with the naked eye was made in 1546 by Fracastorius of the celebrated Padua University. The beginning of microbiology as a science ran parallel to the evolution of microscope. After the introduction of the first compound microscope by Jansen (1590), Kircher in 1659 saw minute living matters in decomposed meat, vinegar, milk etc. The first man who saw micro-organisms was probably Leeuwenhoek (1676) who described the tiny animalcules which he saw by means of a simple glass lens in "Collected water in a dish" and reported the same in a paper to the Royal Society in London About a hundred years later (1773), the Danish microbiologist Muller undertook a systematic study of micro-organisms and classified and named them according to the code developed by Linnaeus. Naegeli (1857) and later Cohn (1872) made some brilliant researches due to which accurate and modern classification of bacteria became possible. Cohn actually laid the foundations of modern bacteriology almost exactly 200 years after bacteria were first observed.

Bacteriology became established as a distinctive branch of scientific knowledge following the works of Pasteur and Koch. Pasteur in 1857 showed that lactic acid fermentation depends on the presence of sub-visible organisms. The economic significance of bacteria was also demonstrated by him. He showed that bacteria and related organisms such as yeasts were the agents which produce fermentation, decay and even disease. In 1878 Koch, discovered the anthrax and tuberculosis bacilli. On 24th March 1882 he announced to Berlin Physiological Society his discovery of the tubercule bacillus. He also did important research on plague in India and showed the role of the rat flies in the spread of the disease. Smith proved the importance of soil bacteria and their contributions to soil fertility. In 1880-81 Pasteur succeeded in immunizing animals against diseases like fowl cholera, anthrax etc.

The modern methods of bacteriology and their begining in the work of Pasteur. C. Weight introduced the use of strains in 1871 and Koch (1881) discovered the method of separating mixtures of organisms on plates of nutrient media solidified with gelatin. The techniques of bacteriology thus developed began to be applied to the study of other micro-organisms and its importance in industrial microbiology like brewing, wine making, manufacture of cheese, disposal of sewage etc. was also established during the 1880's and 1890's.

The period from 1800 to 1900 was eventful in the history of microbiology. Microbiology came of age during this period. The work of Koch and Pasteur respectively gave two directions to the subsequent development of microbiology. Koch and his students concentrated on the isolation and exhaustive study of individual bacteria. In due course this led to the foundations of many highly specialized branches of bacteriology. Pasteur and his students attacked the problems of prevention and control of infectious diseases by means of artificial vaccination. The results led to the creation of a branch of science called immunology. By his researches on chicken cholera, anthrax, swine erysipelas, and rabies between 1880-1888, Pasteur first directed attention to the practical and theoretical possibilities of immunity.

The growth of chemotherapy in microbiology began with Ehrilich's discovery of Salvarsan for the treatment of syphilis in 1911. The discovery of sulphonamides by Domagk and subsequently penicillin by Alexander Fleming established it as one of the most active areas of microbiological research. Microbiology was for a long time very largely an applied science empirical in outlook, and isolated from the mainstream of biological knowledge. The past thirty years have produced a radical change in this situation. Many of the concepts of modern biochemistry, have originated in work on the metabolism of micro-organisms. Molecular genetics, largely based on work with bacterial mutants, has added a new dimensions to the concepts and ideas of classifical genetics. Studies on the inter-actior between viruses and host cells have modified our notions concerning cellular individuality and integrity. In these and many other ways microbiology is now making fundamental contributions to the concepts of biology as a whole.

Marjory Stephenson who pioneered the study of chemical microbiology recognized five levels of investigation in the history of microbiology upto 1945. In level A of Initial Exploration, mixed cultures were studied in natural environments. In level B, initiated by Pasteur and Koch the activities and properties of pure cultures were studied, and the great development of medical microbiology took place. In level C the breakdown of substances by "washed suspensions of resting cells" was investigated and information obtained about the fermentative and oxidative activities of bacteria and yeasts. In the level D of nutritional studies pure cultures were grown on chemically defined media and knowledge concerning the pathways utilized for the biosynthesis of cellular material obtained. In level E the biochemist elucidated the mechanisms responsible for the different metabolic pathways and studies the individual enzymes involved in them. Since then a sixth level of investigation has been established and gained overwhelming importance. This level is concerned with genetic studies of unicellular organisms from which has come the recent spectacular advances in molecular biology and genetics.

Literature of Microbiology

With the emergence of microbiology as a branch of scientific knowledge, journals devoted exclusively to microbiology, started publication to cater to the needs of microbiologists engaged in research in this field. Prior to it, research workers in this field used to publish their papers in medical journals and also to journals devoted to other related disciplines. The first journal devoted to microbiology was perhaps "Revue Mycologique". It started from Toulouse, France in the year 1879 and continued upto 1906. The second one was "Archiv fur Hygien and Bakteriologie" which appeared at München in the year 1883. Another important journal "Zeitschrift für Hygiene and Infektionskrankheiten" started in the year 1886 from Leipzig and continued publication upto 1944 and after a brief break restarted publication in 1947 under a new extended title "Zeitschrift für Hygiene Infektionskrankheiten medizinische Mikrobiologie Immunologie und Virologie" and ran in this name from 1947-1965 (Vols. 148-151) and from Vol. 152 (1966) it is still running under a new name "Zeitschrift für medizinische Mikrobiologie und Immunologie". In Paris, "Annals de l'Institut Pasteur" started publication in 1887. "Archives de parasitologie', and 'Annales de parasitologie humaine et Comparee' were launched from Paris in 1898 and 1923 respectively. In 1887 an important abstracting journal "Zentralblatt fur Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene" appeared in Jena, Stuttgart and was bifurcated later as Abteilung I & II in 1895. The abteilung I was further sub-divided in 2 sections in 1902 as "Originale" and "Referate" while the abteilung II is still continuing with temporary suspension from May 1945 to Nov. 1947. 'Zeitschrift fur Parasitenkunde' was founded in Berlin in 1928 and was suspended with Vol. 13 No. 2, (1943) and again resumed publication with Vol. 14 (Jan. 1949) under the same title and is still going strong.

In the U.S.A. the "Journal of Infectious Diseases' (official publication of the Infectious Diseases Society of America) began to appear in 1904 and the 'Journal of Parasitology' (offical organ of the American Society of Parasitologists which was founded in 1924) in 1914. In 1916 two important journals entitled "Journal of Bacteriology' and 'Journal of Immunology' bagan to appear from the U.S.A. The former is a publication of the American Society for Microbiology (founded in 1899 as Society of American Bacteriologists) while the latter is the Official organ of the American Association of Immunologists. In order to cope with the rapid growth of knowledge and literature on virology and 'Infections and Immunity' sections of the Journal of Bacteriology, the American Society for Microbiology had to take the role as progenitor by founding two offsprings of Journal of Bacteriology. The first one 'Journal of Virology' started as a bi-monthly publication from February 1967 and is the medium for dissemination of fundamental knowledge concerning viruses of bacteria, plants and animals. The second journal 'Infection and Immunity' began to appear as a monthly one from the January 1970 and is scheduled to disseminate the advanced fundamental knowledge concerning immunology, pathogenic micro-organisms and infection, antimicrobial agents and chemotherapy and ecology, epidemiology, and host factors. In the U.S.A. the first abstracting journal exclusively devoted to microbiology was perhaps 'Abstracts of Bacteriology' which started publication in 1917 and was discontinued with Vol. 9 (Dec., 1925) and merged in Biological Abstracts. The reputed 'Bacteriological Reviews' started from Baltimore in 1937,

In the U.K., the first important journal in this field was the 'Journal of Pathology and Bacteriology' which appeared in 1892. 'Annals of Tropical Medicine and Parasitology' and the famous 'Parasitology' started publication in 1907 and 1908 respectively. The Danish 'Acta pathologica et microbiologica scandinavica' came out in 1924, the Italian publications 'Giornale di batteriologia e immunologia; 'Bolletinno della Sezione italiana. Societa internazionale di microbiologia' and 'Rivista di parassitologia' came out from Torino Milano and Roma in the year 1926, 1929 and 1937 respectively.

The first Russian publication on the subject was perhaps 'Zhurnal microbiologii' which came out from St. Petersburg in 1914 and continued upto 1919. From 1924 another journal 'Zhurnal mikrobiologii, patologii i infektsionnykh boleznei' came out from Moscow in 1924 and continued under this title upto 1929 and from 1930 it took a short title 'Zhurnal mikrobiologii i immunobiologii' and ran upto 1934 which is now being published from 1935 under a modified title 'Zhurnal mikrobiologii, epidemiologii i immunobiologii' and is considered as a standard journal on the subject. Other important Russian publications are 'Mikrobiologiya' (1932-) and 'Mykrobiolohichniyi zhurnal' (1934-).

In 1930, another standard German publication began to appear in the name 'Archiv für Mikrobiologie'. The name of a German journal which appeared in 1908, ceased publication and again reappeard as "Zeitschrift fur Immunitatsforschung und experimentelle Therapie", Jena (1908-45, 1949-) is worth mentioning. From Netherlands 'Antonie van Leeuwenhoek, Journal of Microbiology and Serology' was founded in the year 1934. The Swiss Journal 'Schweizerische Zeitschrift fur allgemeine Pathologie und Bakteriologie' started publication from Basel in 1938 and continued upto 1941 and then after a break of eight years restarted in 1950 and continued upto 1959 under the same title. From 1960 it is being published under a new name 'Pathologia et microbiologia' and is considered as a good medium for disseminating microbiological literature.

The above is in nut shell the history of evolution of microbiological journals upto the later part of the thirties of the 20th century. Because of the rapid expansion of microbiological research leading to the emergence of new areas like virology and also because of the influence of the new levels of investigation like chemical microbiology and molecular biology, there has been an increase in the literature of microbiology to such an extent during the period after 1945 that no research worker can hope to keep himself abreast of the recent progress made in various facets of this discipline.

Further, from a study of the World List of Scientific Periodicals, ed. 4, it can be seen that the number of journals in the field of microbiology has increased from 19 in 1900 to 68 in 1920, 160 in 1940 and 286 in 1960. Though the exact figure from 1960 onwards to date is not available, yet it is believed that this upward trend will be even more in the year, ending in 1980. Thus larger numbers of specialist journals, wide scatter of literature because of relevance to so many areas of study, and the multi-faceted points of view of investigations have all combined to multiply the difficulty of tracking down all relevant literature in this discipline. Like biochemistry, microbiology is also going through a phase in which the area of study is expanding in new directions, particularly in such new aspects as immunochemistry, biochemical virology and molecular genetics that research results of importance are scattered to a considerable extent outside periodicals exclusively concerned with the established branches of microbiology. Such results are likely to go unnoticed if the literature search is confined within the limits of acknowledged microbiological literature.

Taking all these facts into account, we have taken Annual Review of Microbiology, Vols. 22-24, 1968-70 as the source journals for citation counting and preparing a ranked list of journals in the field of Microbiology. Advantages of selecting Annual Reviews as source journal have been discusssed by Sengupta [1] in one of his earlier paper. The Annual Review of Microbiology answers the needs of microbiologists with diverse interests, exhaustively supplements the treatment of the more limited topics appearing in research journals and integrates the different points of view of leading specialists in the field by publishing reviews of a critical nature by different authors. It may therefore be considered an authentic source journal for citations. Further during recent years no ranking of periodicals in this field has been made and thus it is expected that this table may help librarians, documentalists and research workers in choosing the microbiology journals which would most effectively cover the significant literature in the subject

The results are presented and discussed in this paper.

Terminology and Techniques

In this communication the term "Serials." has been taken to denote publications brought out in running numbered sequence to be published for an indeterminate period of time, generally at regular intervals, normally not more than one year, although irregularity in frequency of publication is not ruled out. Proceedings of congresses, colloquia, meetings etc. held periodically are considered serials in case a permanent parent organization exists for arranging their publication, otherwise they are treated as books. Also, if the colloquia, lectures etc are not published in a numbered sequence, they have been noted as non-serial publications. A similar classification has been made for monographs of learned societies. Serial annual publications devoted to recent advances, progress series and other nonprimary serial publications consisting of review articles have been grouped together separately for purposes of analysis. Citations of secondary periodicals have not been included with the serial citations in case the names of primary journals in which the original articles appears are given. Unpublished data, personal communications, theses and dissertations, reports, papers in press or awaiting publications are noted separately and treated as non-serial citations. All citations published at the end of the articles, within the texts of the article, and in foot notes are counted.

The journals appearing in the overall tanked list were classified broadly into 23 subject groupings using the U.D.C. scheme as a guide for classification: science (general) chemistry; biological sciences (general); experimental biology and medicine; genetics; cell biology; microbiology; virology; immunology; parasitology; biochemistry (including molecular biology and biophysics); botany; plant physiology; zoology; physiology; public health and hygiene; experimental medicine; pathology; medicine (general); medicine (specialities); agriculture; veterinary science; industrial microbiology.

In order to assess growth of microbiological journals World List of Scientific Periodicals , ed. 4. has been scanned thoroughly and the number of titles devoted to microbiology noted and a graph (vide fig. 1) drawn to show the increasing number of periodicals in this subject.

The ranked list is essentially a practical tool designed to help the librarian and research scientist to select the journals of maximum utility in relation to their coverage of new and important literature in particular subject areas. However, because of the large volume of research effort in frontier areas of science where two or more subject fields overlap, publications of importance to an individual area of study tend to appear increasingly in journals devoted to general science or broad areas of science covering more than one speciality, Such journals naturally are voluminous publications. To view the importance of individual titles in clear perspective in respect of a particular area of study it is therefore necessary to analyse the number of citations from a journal in relation to the total number of papers published in a year and the average length of the papers. This has been attempted in respect of the first ten titles in the ranking list in Table 9.

Discussions

Table 1 shows the frequency of distribution of serial and non-serial publications. The distribution is very similar to what Sengupta[2] reported in the case of biochemistry. This close similarity may be thought to reflect in part the predominantly biochemical bias of present day microbiological research, and in part a general pattern characterizing publication practice in all scientific disciplines.

No ranking of journals in microbiology has been published so far. Table 2 provides a ranking list of periodicals in the field of microbiology. The journals listed in this table may be considered the preferred media for the reporting of new microbiological knowledge. The list can be regarded as free from any national or regional bias as it has been prepared on the basis of citations in A. Rev. Microbiol. which publishes articles reviewing the progress of knowledge in areas of microbiological research solely on the basis of current scientific interest and written by leading workers in the concerned topic drawn from different parts of the world. It should therefore serve as an authentic tool for the selection of journals which publish articles of interest to microbiology. In this study 624 titles have been noted and out of these only the first 141 titles have been shown in Table 2. The bulk of 483 titles which have been referred to less than 7 times, i.e. less than 1% of the highest cited periodical (12, 24, 23, 50, 92 and 282 titles have been cited 6, 5, 4, 3, 2 and 1 times respectively) have been left out so that the list may not be unduly lengthy. It is expected that the present ranking list should help researchers, librarians and documentalists of microbiological research centres to formulate their acquisition policy for serial publications and also for preparation and circulation of documentation lists emphasizing the contents or abstracts of highly ranked journals for the guidance of their potential readers.

One of the features of this ranked list calling for comments is the high position of journals in the field of general science and biochemistry. Out of the first ten titles in the ranking list, three (nos. 2, 4 and 10) are journals of general science and four (nos. 5. 6. 7 and 9) are of biochemistry. The reason for this may be the present predominant interest in molecular biology to which, besides biochemical journals, general science journals also devote a major portion of their space. This view is also borne out by the high ranking of journals in virology (nos. 3, 18 etc) a discipline basic to present experimental work in molecular biology. J. Bact. occupies the top position in the list. The reason for this journal occupying the first position may be its comprehensive coverage which includes: Taxonomy and Ecology; Morphology and Ultrastructure; Genetics and Molecular Biology; Physiology and Metabolism; Enzymology, clearly indicating the coverage given by this journals to topics like molecular biology and biochemistry. The high position of J. molec. Biol. (S. f. 5) undoubtedly reflects the new directions of interest in present day biological research. Many post-war journals (nos. 3, 5, 7, 8, 9, 16, 18, 19, 20, 21 etc) occupy relatively high positions. This conforms to expectation and was predicted by Sengupta[3] in an earlier paper. The papers published in these journals reflect the present day trends and areas of research interest in this field. Journals primarily related to medical microbiology e.g. J. infect. Dis.; J. Hyg., Camb.; and J Path. Bact. occupy relatively lower positions (nos. 23, 49, 60 respectively). This may perhaps be due to the shift of research interest from this area to studies at molecular and submolecular levels.

Table 3 analyses the frequency of citations of publications other than primary journals. Here citations of non-primary serials are the highest. Proceedings of irregular conferences/symposia etc are seen to be becoming increasingly important. The high proportion of citations in the 'miscellaneous' category would be expected in reviews prepared by scientists actively working on the topics of the reviews, because they would try to give a balanced account of the state of knowledge in the manner they regularly assess it, that is on the basis not only of published literature but also unpublished work, personal communications, theses and dissertations etc.

Table 4 provides a ranking list of some non-primary serial publications. It brings out the importance of Bact. Rev. and Annual Reviews. This list again reflects the important place of molecular biology in present-day research in microbiology.

Table 6 is an analysis of citations of the first twentyfive journals in the present list according to the period of publication of cited articles. Citations of each journal have been grouped into eight sequences (prior to 1901, 1901-20, 1921-40, 1941-50, 1951-55, 1956-60, 1961-65 and 1966-70). It may be seen that nearly 85-90% of the citations are of articles published during 1960-70, with an even greater predominance of post-1965 articles. Thus it is seen that 55; 02 % of total citations of these 25 journals relate to the period 1966-70, 30.72% to 1961-65, 8.58% to 1956-60, 2.89% to 1951-55, 2.6% to 1941-50, 0.59% to 1921-40 and 0.03 % to the period 1901-20. Except in the cases of J. exp. Med. and J. infect. Dis. no references to articles earlier than 1921 are noted. This distribution of citations is according to expectation, because in a phase of rapid development of new frontier areas of research like molecular biology, older literature relating to the classical interests of a scientific discipline ceases to be the stimulus to new research activity. This analysis will help in selecting back issues of journals which are in infrequent demand for storage and will help in solving the space problem in a library as suggested in one of Sengupta's[4] earlier publications.

Table 5 gives an analysis of the first 141 periodicals of the present list according to subject classification (vide Table 2). Four subject fields namely, biochemistry (23.6%), microbiology (22.4%), science, (general) (18.1 %) and virology (10%), out of the 23 subject classifications cover nearly 74% of the total citations. It supports our view about the predominant bias towards molecular biology and declining interest in medical aspects of microbiology. It also reflects the decline in the interest on the part of the medical scientist in infectious diseases which have now been mostly contained or are amenable to therapy. As observed earlier, the high frequency of citations (18.1 %) of journals of general science may perhaps be due to the good coverage given by these journals to microbiological studies at the molecular level.

Growth in the number of journals in the field of Microbiology from 1860 - 1960.

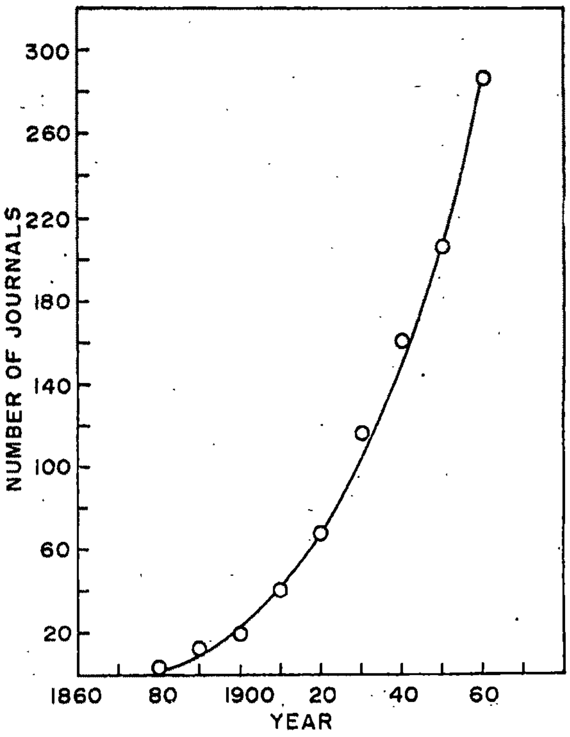

Fig. — I.

Table 7 indicates clearly that English is the main medium of communications in microbiology. Nearly 58.9% journals are published in English. Next come trilingual journals (19.2%) with English, French and German of which, however, the major proportion of papers is in English. The position of journals with French as text (5 %) is higher than journals with German as text (2.1%). Thus the decline in importance of German as an exclusive language of scientific communications is further corroborated by Brown [5] and Sengupta [6, 1].

Table 8 provides as analysis of countrywise distribution of the journals in the ranking list. U.S.A., U.K., Germany, Japan, France, Netherlands and the Scandinavian countries are the main producers, in that order, of journals which constitute the important media for the communication of new knowledge in microbiology. However, 58.03% citations are covered by 54 journals published in the U.S.A.; 23.24% by 29 English periodicals. It is interesting to note that 4.9% citations are covered by 5 journals from Netherlands which is higher than the citations covered by 11 German periodicals and 8 French Journals, the German and French periodicals roughly cover 4.2% and 2.5% of citations respectively.

Table 9 analyses the number of citations in relation to size of journal and average length of the papers published. We had proposed this method of analysis in order to eliminate the bias due to the bulk of a research periodical and unrelated to the scientific value of individual papers published in it that is inevitable in ranking lists prepared on the basis of numerical counting of citations of individual periodicals [Sen Gupta (2), 1972]. The value D/A is an index of the scientific value of the papers published in a journal, corrected for the bulk of material published in a year, which varies considerably from journal to journal. When titles in the uncorrected ranking list are re-ranked according to the value of $\frac{D}{A}$, the revised list puts the journals in order of their scientific value without bias due to bulk. Similarly the index $\frac{D}{C}$ enables a listing of the titles in order of scientific value of the papers published, with a weightage introduced for compactness of presentation. From Table 9 it is seen that in the case of the first ten titles of the present ranking list, re-ranking on the basis of D/A puts the titles in the order - Virology; J. gen. Microbiol.; J. Bact.; J. molec. Biol.; Proc. natn. Acad. Sci. U.S.A.; Biochem. biophys. Res. Commun.; J. biol. Chem.; Sciences, N.Y.; Nature, Lond.; and Biochim. biophys. Acta. Priority in acquisition may therefore be given in this order.

Fig. 1 shows the growth of microbiological periodicals upto 1960. The steep rise of the curve indicates the exponential increase in research activity and in the number of journals in the field of microbiology.

Finally, the results of this study, as in our earlier study on biochemistry, also justifies the validity of Bradford's Law of Scattering [7] and Sengupta's [2] Extension of Bradford's Law. The findings of Table 2, however, do not support Garfield's Law of Concentration [8].

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Table 1

Frequency of distribution of serial and non-serial publications

Category of publications	Number of citations	percentage of total citations
Primary journals	8951	86.00
Non-primary serial publications	493	4.7
Non-serial publications	964	9.3
	10408	100.00

Table 2

Ranked list of journals in microbiology

Rank	Name of Journal (in abbreviated form)	Country of publication	Year of publication	Number of citations	Percentage of total journal citation
1	J. Bact.	USA	1916	744	8.31
2	Proc. natn. Acad. Sci. U.S.A.	USA	1915	619	6.92
3	Virology	US	1955	577	6.45
4	Nature, Lond.	UK	1869	452	5.05
5	J. molec. Biol.	UK	1959	436	4.87
6	J. biol. Chem.	US	1905	353	3.94
7	Biochem. biophys. Acta	Netherlands	1947	313	3.50
8	J. gen. Microbiol.	UK	1947	301	3.36
9	Biochem. biophys. Res. Commun.	US	1959	223	2.49
10	Science, N.Y.	US	1883	217	2.42
11	Biochem. J.	UK	1906	196	2.19
12	J. exp. Med.	US	1896	156	1.74
13	Cold Spring Harb. Symp. quant. Biol.	US	1933	121	1.35
14	J. Immun.	US	1916	114	1.26
15	Arch. Mikrobiol.	Germany	1930	113	1.26
16	Archs Biochem. Biophys. (formerly: Archs Biochem.)	US	1952	106	1.18
17	Proc. Soc. exp. Biol. Med.	US	1903	101	1.13
18	J. Virol.	US	1967	98	1.09
19	Biochemistry	US	1962	96	1.07
20	Can. J. Microbiol	Canada	1954	88	0.98
21	Bact. Proc.	US	1950	78	0.87
21	Genetics	US	1916	78	0.87
23	J. infect. Dis.	US	1904	73	0.82
24	Annls. Inst. Pasteur, Paris	France	1887	67	0.75
25	Ann. N.Y. Acad. Sci.	US	1823	66	0.74
25	C. r. hebd. Seanc. Acad. Sci., Paris	France	1835	66	0.74
27	J. Cell Biol. (formerly: J biophys. biochem. Cytol.)	US	1955	63	0.70
28	Appl. Microbiol.	US	1953	60	0.67
29	J. natn. Cancer Inst.	US	1940	55	0.61

Continued

30	Fedn. Proc. Fedn. Am. Socs. exp. Biol.	US	1942	51	0.57
31	Eur. J. Biochem. (formerly: Biochem. Z.)	Germany	1967	50	0.56
31	Expl. Cell Res.	US	1950	50	0.56
31	J. gen. Virol.	UK	1967	50	0.56
34	Antonie van Leeuwenhoek	Netherlands	1934	47	0.53
35	J. Biochem., Tokyo	Japan	1922	45	0.50
36	Cancer Res.	US	1941	41	0.46
37	J. appl. Bact.	UK	1938	40	0.45
38	Genet. Res.	UK	1960	39	0.44
39	Zentbl. Bakt. Parasitkde, Abt. Originale	Germany	1902	38	0.42
40	Am. J. trop. Med. Hyg.	US	1952	36	0.40
40	Arch. ges. Virusforsch.	Austria	1939	36	0.40
42	Acta virol., Prague	Czechoslovakia	1957	35	0.39
42	J. cell Physiol. (formerly: J cell comp. Physiol.)	US	1932	35	0.39
44	J. Protozool.	US	1954	33	0.37
44	Physiologia Pl.	Denmark	1948	33	0.37
46	Z. Naturf.	Germany	1946	32	0.36
47	Molec. gen. Genet. (formerly: Z. VerebLehre)	Germany	1908	31	0.35
48	Trans. R. Soc. trop. Med. Hyg.	UK	1907	30	0.34
49	J. Am. chem. Soc.	US	1879	29	0.32
49	J. Hyg., Camb.	UK	1901	29	0.32
51	Pl. physiol., Lancaster	US	1926	28	0.31
51	Proc. R. Soc. Ser. B.	UK	1905	28	0.31
51	Am. J. Bot.	US	1914	28	0.31
54	Am. J. vet. Res.	US	1940	27	0.30
54	Lancet	UK	1823	27	0.30
56	Am. J. Enol. Vitic.	US	1954	26	0.29
56	Bull. Wld. Hlth. Org.	Switzerland	1947	26	0.29
58	Br. med. J.	UK	1857	25	0.28
59	Immunology	UK	1958	23	0.26
60	J. comp. physiol. Psychol.	US	1947	22	0.25
60	J. Path. Bact.	UK	1892	22	0.25
62	Phytopathology	US	1911	21	0.23
62	Symp. Soc. gen. Microbiol	UK	1949	21	0.23
64	Hoppe-Seyler's Z. physiol. Chem.	Germany	1877	20	0.22
64	J. mar. biol. Ass., U. K.	UK	1877	20	0.22
64	J. Phycol.	US	1965	20	0.22
67	Br. J. exp. Path.	UK	1920	19	0.21
68	Acta microbiol. pol.	Poland	1951	18	0.20
68	Bull. Off. int. Epizoot.	France	1931	18	0.20
70	Int. J. Cancer	Denmark	1966	17	0.19
70	J. Invertebr. Path. (formerly: J. Insect Path.)	US	1959	17	0.19
70	J. Ultrastruct. Res.	US	1957	17	0.19
70	Mutat. Res.	Netherlands	1964	17	0.19
74	Biophys. J.	US	1960	16	0.18
75	Agric. biol. Chem. (formerly: Bull. agric. chem. Soc. Japan)	Japan	1924	15	0.17
75	Ann. trop. Med. Parasit.	UK	1907	15	0.17
75	Dokl. Akad. Nauk SSSR	USSR	1922	15	0.17
75	Hered tas	Sweden	1920	15	0.17
75	Hereditas				
75	J. gen. appl. Microbiol.	Japan	1955	15	0.17
80	Annls Technol. Agric.	France	1952	14	0.16

Continued

80	Aust. J. exp. Biol. med. Sci.	Australia	1924	14	0.16
80	Biken's J.	Japan	1958	14	0.16
80	J. Am. med. Ass.	US	1883	14	0.16
80	J. Cell. Sci. (formerly: Q. J. microsc. Sci.)	UK	1966	14	0.16
80	Pl. Cell Physiol., Tokyo	Japan	1959	14	0.16
80	Proc. int. Congr. Microbiol	US	-	14	0.16
87	Am. J. Epidem. (formerly: Am. J. Hyg.)	US	1921	13	0.15
87	Biotech. Bioengng	US	1959	13	0.15
87	J. gen. Physiol.	US	1918	13	0.15
87	Microbiologiya	USSR	1932	13	0.15
87	Transplantation	US	1963	13	0.15
87	Zentbl. Vet. Med.	Germany	1953	13	0.15
93	Acta chem. scand.	Denmark	1947	12	0.13
93	Angew. Chem.	Germany	1888	12	0.13
93	Ann. Bot.	UK	1887	12	0.13
93	Folia microbiol., Praha	Czechoslovakia	1959	12	0.13
93	Japan. J. Microbiol.	Japan	1957	12	0.13
93	Limnol. Oceanogr.	US	1956	12	0.13
93	Pl. Soil.	Netherlands	1948	12	0.13
100	Acta path. microbiol. scand.	Denmark	1924	11	0.12
100	Analyt. Biochem.	US	1960	11	0.12
100	Med. Biol.	Japan	1942	11	0.12
100	Mitt. Hoheren Bundeslehr Versuchsanst Wein-Obst Gartenbau Klosterneuburg Serie A Rebe Wein.	Austria	1954	11	0.12
100	Res. vet. Sci.	UK	1960	11	0.12
100	Zentbl. Bakt. ParasitKde, Abt. II.	Germany	1895	11	0.12
100	New Engl. J. Med.	US	1928	11	0.12
107	Bull. Soc. Chim. biol.	France	1914	10	0.11
107	Expl. Parasit.	US	1951	10	0.11
107	Jap. J. med. Sci. Biol.	Japan	1952	10	0.11
107	J. theor. Biol.	UK	1961	10	0.11
107	Vinod. Vinogr. SSSR	USSR	1939	10	0.11
112	Annali Microbiol. Enzimol (formerly: Annali Microbiol.)	Italy	1949	9	0.10
112	Bull. Acad. pol. Sci. Cl. II, Ser. Sci. biol.	Poland	1953	9	0.10
112	Bull. Off. int. Vin.	France	1928	9	0.10
112	J. Parasit.	US	1914	9	0.10
116	Arch. Protistenk.	Germany	1902	8	0.09
116	Bull. Soc. Path. exot.	France	1908	8	0.09
116	Can. J. Bot.	Canada	1951	8	0.09
116	Indian J. Malar.	India	1947	8	0.09
116	J. clin. Invest.	US	1924	8	0.09
116	Parasitology	UK	1908	8	0.09
116	Photochem. Photobiol.	US	1962	8	0.09
116	Publ. Hlth. Rep. Wash.	US	1878	8	0.09
124	Biochem. Soc. Symp.	UK	1947	7	0.08
124	Blood	US	1946	7	0.08
124	Bull. math. Biophys	US	1939	7	0.08
124	Entomophaga	France	1956	7	0.08
124	Experientia	Switzerland	1945	7	0.08
124	FEBS Lett.	Netherlands	1968	7	0.08
124	G. Microbiol.	Italy	1955	7	0.08
124	Immunochemistry	UK	1964	7	0.08
124	Jap. J. Genet.	Japan	1921	7	0.08

Continued

124	J. chem. Soc.	UK	1849	7	0.08
124	J. exp. Bot.	UK	1950	7	0.08
124	J. Hyg. Epidem. Microbiol. Immun.	Czechoslovakia	1957	7	0.08
124	J. Pharmac. exp. Ther.	US	1909	7	0.08
124	Phytochemistry	UK	1962	7	0.08
124	Revta Ciencia apl.	Spain	1947	7	0.08
124	S. Afr. J. agric. Sci.	South Africa	1958	7	0.08
124	Trans. N. Y. Acad. Sci.	US	1881	7	0.08
124	Vitis	Germany	1956	7	0.08
141	Other titles (each having citations less than 7) covering citations			8,051	89.95
483	Total:			900	10.05
624	G.T.			8951	100.00

TABLE 3.

*Frequency of citations of publications other than primary journals.

Category of publications	No. of citations	Percentage	Percentage of all citations counted
Non-primary serial publications	493	33.84	4.74
Books and monographs (without regular sequence)	374	25.67	3.59
Irregular conference/ Symposium/Proceedings	206	14.14	1.98
Theses/Dissertations	40	2.75	0.38
Reports	30	2.06	0.29
In press and to be published data	28	1.92	0.27
Patents and standards	6	0.41	0.06
Miscellaneous (incomplete reference, unpublished data, personal communication, in preparation etc.)	280	10.22	2.69
Total:-	1457	100	14.00

TABLE 4

Ranking of first 11 non-primary serial publication

Rank	Name of non-primary serial publication	Number of citations	Percentage of total non-primary serial citations
1.	Bact. Rev.	86	17.44
2	A. Rev. of Microbiol.	72	14.60
3	A. Rev. Biochem.	56	11.36
4	A. Rev. Genet.	28	5.68
5	Adv. Enzymol.	19	3.85
6	A. Rev. Med.	17	3.45
7	Adv. Virus Res.	15	3.04
8	Prog. med. Virol.	14	2.84
9	Adv. Immun.	10	2.03
9	Biol. Rev.	10	2.03
9	Prog. Nucl. Acid Res. molec. Biol.	10	2.03

Analysis of citations according to subject classification of periodicals

Table 5

Sl. No.	Subject classification	No. of titles in ranking list	Total No. of citations	Percentage of total citations of first 141 journals
1	Science (General)	9	1456	18.08
2	Chemistry	7	107	1.33
3	Biological Sciences (General	8	259	3.22
4	Experimental Biology and Medicine	3	125	1.55
5	Genetics	6	187	2.32
6	Cell Biology	4	144	1.79
7	Microbiology	23	1799	22.35
8	Virology	6	803	9.97
9	Immunology	2	137	1.70
10	Parasitology	4	60	0.75
11	Biochemistry	17	1903	23.64
12	Botany	6	96	1.19
13	Plant Physiology	3	75	0.93
14	Zoology	1	17	0.21
15	Physiology	3	70	0.87
16	Public Health and Hygiene	3	50	0.62
17	Experimental Medicine	1	156	1.94
18	Pathology	5	70	0.87
19	Medicine (General)	7	128	1.59
20	Medicine (Specialities)	11	237	2.94
21	Agriculture	4	48	0.60
22	Veterinary Science	4	69	0.86
23	Industrial Microbiology	4	55	0.68
	Total:	141	8051	100

Table 6
Analysis of citations of the first twentyfive journals of the present list according to period of publication of cited article

Journal and present ranking (Year of first publication in parentheses)		Percent citations of articles published during								Total
		Upto 1900	1901-'20	1921-'40	1941-'50	1951-'55	1956 '60	1961-'65	1966-'70	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	J. Bact (1916)	-	-	(1. 48)	(2. 55)	(3. 76)	(7. 26)	(30. 38)	(54. 57)	744
2	Proc. natn. Acad. Sci. U. S. A. (1915)	-	-	(0. 48)	(1. 45)	(0. 81)	(4. 85)	(32. 63)	(59. 77)	619
3	Virology (1955)	-	-	-	-	(0. 35)	(9. 53)	(31. 89)	(58. 23)	577
4	Nature, Lond. (1869)	-	-	-	(0. 89)	(6. 19)	(10. 40)	(34. 29)	(48. 23)	452
5	J. molec. Biol. (1959)	-	-	-	-	-	(1. 61)	(28. 44)	(69. 95)	436
6	J. biol. Chem. (1905)	-	-	(0. 85)	(3. 97)	(5. 10)	(11. 61)	(30. 88)	(47. 59)	353
7	Biochim. biophys. Acta (1947)	-	-	-	-	(3. 51)	(9. 27)	(38. 66)	(48. 56)	313
8	J. gen. Microbiol. (1947)	-	-	-	(0. 99)	(3. 99)	(17. 61)	(35. 55)	(41. 86)	301
9	Biochem. Biophys. Res. Commun. (1959)	-	-	-	-	-	(3. 59)	(39. 56)	(56. 95)	223
10	Science, N. Y. (1883)	-	-	-	(2. 30)	(2. 76)	(9. 22)	(30. 41)	(55. 30)	217
11	Biochem. J. (1906)	-	-	(1. 53)	(4. 59)	(4. 08)	(13. 78)	(23. 98)	(52. 04)	196

Continued

12	J. exp. Med. (1896)	-	(0.64)	(8.33)	(4.49)	(1.28)	(5.13)	(32.69)	(47.44)	156
13	Cold Spring Harb. Symp. Quant. Biol. (1933)	-	-	-	(1.65)	(4.96)	(2.48)	(29.75)	(61.16)	121
14	J. Immun. (1916)	-	-	(7.89)	(4.39)	(3.51)	(6.14)	(28.07)	(50.00)	114
15	Arch. Mikrobiol. (1930)	-	-	(0.88)	-	(5.31)	(17.70)	(29.20)	(46.90)	113
16	Archs Biochem. Biophys. (1952)	-	-	-	-	(5.66)	(20.75)	(21.70)	(51.88)	106
17	Proc. Soc. exp. Biol. Med. (1903)	-	-	(0.99)	(8.91)	(2.97)	(4.95)	(31.68)	(50.50)	101
18	J. Virol. (1967)	-	-	-	-	-	-	-	(100)	98
19	Biochemistry (1954)	-	-	-	-	-	-	(15.63)	(84.38)	96
20	Can. J. Microbiol. (1954)	-	-	-	-	(2.27)	(18.18)	(34.09)	(45.45)	88
21	Bact. Proc. (1950)	-	-	-	-	(1.28)	(6.41)	(19.23)	(73.08)	78
21	Genetics (1916)	-	-	(1.28)	(1.28)	(3.85)	(3.85)	(30.77)	(58.97)	78
23	J. infect. Dis. (1904)	-	-	(6.85)	(20.55)	(12.33)	(17.81)	(19.18)	(21.92)	73
24	Annls Inst. Pasteur, Paris. (1887)	-	-	(2.99)	(8.96)	(5.97)	(7.46)	(29.85)	(44.78)	67

Continued

25	Ann. N. Y. Acad. Sci. (1823)	-	-	-	-	(6. 06)	(13. 64)	(28. 79)	(51. 42)	66
25	C. r. hebd. Seanc. Acad. Sci., Paris (1835)	-	-	(1. 51)	-	(1. 51)	(22. 73)	(37. 88)	(36. 36)	66
	Total:-	-	(0. 03)	(0. 59)	(2. 16)	(2. 89)	(8. 58)	(30. 72)	(55. 02)	5852

TABLE 7

Frequency of English and non-English journals in the present ranking list

	English Text	French Text	German Text	Russian Text	Other languages	English, French German (Multi-lingual with 2 or 3 of these languages)	Bilingual of which English is one language	Multilingual with 4 or more languages of which 3 are E, F, G	Total
Number of titles	83	7	3	3	6	27	3	9	141
Percentage of all titles	58. 87	4. 96	2. 13	2. 13	4. 26	19. 15	2. 13	6. 38	100

TABLE 8

Countrywise distribution of journals in the present ranking list

Country of publication	Number of journals	Citations of journals in column 2 as % of total
Australia	1	0.17
Austria	2	0.58
Canada	2	1.19
Czechoslovakia	3	0.67
Denmark	4	0.91
France	8	2.47
Germany	11	4.16
India	1	0.10
Italy	2	0.20
Japan	9	1.78
Netherlands	5	4.92
Poland	2	0.34
S. Africa	1	0.09
Spain	1	0.09
Sweden	1	0.19
Switzerland	2	0.41
U. K.	29	23.24
U. S. A.	54	58.03
U. S. S. R.	3	0.47
TOTAL:	141	100.00

Table 9

Analysis of number of citations in relation to size of journal and average length of the papers published

Name of Journal	No. of papers published during the year (A)	Total No. of pages (B)	Total No. of words (C)	No. of citations noted for 1969 (D)	$\frac{D}{A}$ (No. of citations per paper published)	$\frac{C}{A}$ (Average length of paper in words)	$\frac{D}{C} \times 10^4$ (No. of citations in relation to overall size of volumes published during the year)
J. Bact. Vols.97-100, 169	833	5272	2699264	491	0.589	3240.4	1.8
Proc natn. Acad. Sci. U.S.A. Vol. 62-64, 1969	597	4100	1435000	196	0.328	2403.7	1.4
Virology Vols.37-39, 1969	306	2356	883500	192	0.627	2887.3	2.2
Nature, Lond. Vol. 221-224, 1969	2297	5317	3349710	114	0.050	1458.3	0.3
J. molec. Biol. Vols.39-46, 1969	385	4671	1050975	164	0.426	2729.8	1.6
J. biol. Chem. Vol. 244, 1969	902	6708	3823560	138	0.153	4239.0	0.4
Biochim. biophys. Acta Vols.171-195, 1969	1878	14522	4066160	72	0.038	2165.2	0.2
J. gen. Microbiol. Vols.55-59, 1969	232	2153	734173	139	0.599	3164.5	1.9
Biochem. biophys. Res. Commun. Vols.34-37, 1969	592	3922	686350	109	0.184	1159.4	1.6
Science, N.Y. Vols.163-166, 1969	1209	6057	3694770	77	0.064	3056.1	0.2

CURRENT TRENDS IN INTERNATIONAL MEETINGS AND THEIR PUBLICATIONS: AN ANALYSIS

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Proceedings of international meetings form an important source of information. Taking the Yearbook of International Congress Proceedings, 1970 as the data base an analysis is made of the number of such meetings held, timing of meetings, publication pattern of reports, volume in terms of pages, language break up, geographical distribution, publishers etc.

Professional meetings (conferences, symposia, congresses) produce a wealth of information in the form of papers and subsequent recorded discussions. The documents published before, during and after the meetings vary in their terminologies, contents, size and value which pose serious problems for those engaged in dissemination of information. Documents produced before a meeting are usually called circular letters, preprints (pretirages) and extracts; documents produced during the meeting are texts of speeches, draft-resolutions, discussions; and similarly documents produced after the meeting are known as final report, resolutions, proceedings and summary reports. Equivalents or near equivalents of the word "meeting" are also many e. g. reunion, seminar, congress, conference, colloquium and symposium. Other words also in use are journees, journees d'etudes, session, seminaire, tableonde, stage committee, assemble generale and so on.

Growth and Characteristic

A look at the meetings held and their proceedings listed in the "Yearbook of International Congress Proceedings" 2nd ed., UIA, 1970 reveals not only an increasing trend in the number of meetings held every year but certain other characteristics also. Reports of meetings appear in print in various forms which have been fully discussed in Poindron Study[2]. Most often reports of the meetings are published very late on account of non-submission of papers by participants in time to the organisers responsible for bringing out their reports, and in the absence of which 'preprints' (i.e. copies of the texts of papers which are printed before the meetings) are the ohly a vailable form of material for use. The other common channels of appearance are 1(a) contributed papers in a journal with or without any indication of their being first read at a meeting, 1(b) as a special issue of a journal with or without any distinctive title or any indication of their being read at a meeting, 1(c) appear collectively in a book form with or without any indication of their being meeting papers or prodeedings. 2) Some proceedings are published either by the organizing body or other commercial publishing houses, but quite often they are not reproduced in their entirely or even in summarized form. The weakest point, as the UIA Survey reveals, is that with the preparation of report of the meeting, the organizers regard their job as done without caring how best these reports can be made available to users. The coverage of reports of meetings in general indexing and abstracting periodicals is not very comprehensive.

Value

The full value of a meeting is available to only those who are able to attend it. But their number is always limited due to obvious reasons. Hence, a large number, who cannot attend, has to depend on proceedings or reports. It is held that some reports provide invaluable information on the standardisation of certain symbols, units and nomenclature. Many meeting papers provide authoritative and nascent information on (a) research in progress, (b) plans of future research, (c) research techniques not described in published reports, (d) organizational frame work necessary for international cooperation, and (e) research in advanced countries.

Objectives

In the present study an attempt has been made to analyse the meetings held in the year

1962 and 1967, and their reports as listed in the "Yearbook of International Congress Proceedings" (referred subsequently as the Yearbook) and to study the current trends in international meetings, and also to

i) determine the role played by professional associations and commercial publishers in bringing out reports and identify leading publishing houses in this respect.

ii) study year-wise distribution of meetings held during the period 1962-67.

iii) study trends in subject distribution of meetings held during the year 1962 and 1967.

iv) determine trends in the medium of publication of meetings.

v) determine the time-lag in the publication of reports with respect to their forms of appearance.

vi) study geographical distribution and determine the factors responsible for imbalance.

vii) determine quantitative production with respect to optimum size in terms of pages of reports issued and

viii) find out bibliographic volumes, single or multiple, being produced per meeting.

Hypothesis and Techniques

The word "meeting" is too general and broad and can be broken into various categories. The Philadelphia Working Party, Poindron and CIOMS studies have dealt this point in detail. The word "report" is also loose and requires some definition. For the purpose of this study, the definitions of the terms "meeting" and "report" are same as given in the Introduction at page 7 of the "Yearbook". "Meeting" includes assemblies, conferences, congresses, conventions, round tables, seminars (in-tutorial sense) symposia. "Report" covers abstracts, minutes, pre-prints, proceedings, summaries, working papers, whether produced in printed book form, or reproduced from typescript or incorporated in periodicals, provided that a minimum of about twenty pages are involved.

For the purpose of analysis the bibliographical material was brought under these two distinct categories; "meeting" and report". Meetings have been classified under the main classes of UDC except that subjects under class number 5 and 6 have been grouped together as 5/6 i.e. "Science & Technology". If a publication has dealt with two subjects at a meeting, e.g. "Conference on Science and World affairs", preference has been given to the subject appearing first in sequence. When the subject of the conference was not intelligible from the title of publication help was sought from such publications as the Yearbook of International Organisations, World of Learning etc. In the language distribution, the analysis has been done under six categories; English, French, English/French(bilingual), Spanish, German, and "other mixed" languages. Under the sixth category i.e. "the other and mixed languages" would fall publications in languages such as Russian, Italian, or those published in multiple languages as English/French/German/Spanish etc. The cross reference entry, if any, when referring to the publication belonging to the same year, was excluded, while the one belonging to different year was included in the counting of the number of reports issued for the meetings. Different forms of material in which the publications of meeting first appear have been grouped as (i) Reports published in monographic forms, (ii) those published in serials, (iii) those appearing simultaneously in book form and in serials, (iv) those produced in typescript copies, and (v) those appearing simultaneously in a monograph form and in serials.

The study does not include data on reports issued by United Nations and its subsidiary bodies nor those issued by FAO, IAFA, ILO, UNESCO, WHO as these were not covered in the main chronology of the Yearbook as pointed out on p. 7. The reason being that these organisations have good bibliographical tools of their own and require little reproduction in the Yearbook.

An analysis of Professional associations and Commercial publishers responsible for bringing out the report publications has been done. It may be emphasized that in most cases the organisers were themselves publishers and hence further analysis in respect of them has, however, been omitted.

Analysis

Data in respect of the number of meetings held during the period from 1962 to 1967 is given in Table 1.

There appears to be a trend in the increase of number of meetings held every year. Their number had actually increased from 686 in 1962 to 753 in 1963, from 743 in 1964 to 762 in 1965, to 837 and 867 in 1966 and 1967 respectively. This trend is characteristic of the fact that international meetings are assuming greater importance as a forum for exchange of ideas amongst the members of the international community. In case this trend continues for long, there will be an information explosion which would pose great problems to the librarians, information scientists, administrators, and specialists engaged in the dissemination of information.

Table-1: Yearwise breakup of meetings held during the period 1962-67

Year	1962	1963	1964	1965	1966	1967
No. of meetings	686	753	743	762	837	867

A month by month break up of meetings held during 1962 and 1967 has also been prepared and is given in Table 2.

Table-2: Monthly breakup of meetings held in 1962 and 1967

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1962	13	8	29	53	88	81	69	69	121	78	55	22	686
1967	27	31	28	77	88	94	68	88	161	116	58	31	867

It may be seen that the largest number of meetings were during the period from August to October and minimum numbers in December and January to March. It may be noted that maximum number of meetings took place, in both the years, in the month of September only. September seems to be the best month for international meetings. This has already been commented upon by Genevieve Deville [7]. It is mainly due to an attempt on the part of organisers to hold meetings during tourist seasons and at the same time to avoid interference with the holiday period.

Single and Multiple Reports: A distinction was made between single report (one report per meeting) and multiple reports (more than one report per meeting). The data in this respect is given in Table 3.

Table-3: Breakup of single and multiple reports of meetings held in 1962 and 1967

Year	Single		Multiple		Ratio of multiple reports per meetings	Total
	No. of reports	No. of meetings	No. of reports	No. of meetings		
1962	503/503		529/183		2.89	1032/686
1967	652/652		641/215		2.98	1293/867

The average number of multiple reports produced per meeting has increased from 2.89 in 1962 to 2.98 in 1967. Though this is not an abrupt change, but the trend is towards rise in the number of multiple reports per meeting.

Subject Analysis: A subject break up of meetings held in 1962 and 1967 was done according to the main classes of UDC and is shown with relative percentages in Table 4.

Table-4: Subject break up of meetings held in 1962 and 1967

Year	0	1	2	3	4	5/6	7	8	9	Total No. of meetings
1962	20	3	11	287	3	341	15	-	6	686
	2.92	0.44	1.60	41.83	0.44	49.71	2.18	-	0.87	
1967	22	11	25	349	4	396	48	2	10	867
	2.54	1.26	2.88	40.25	0.46	45.69	5.54	0.23	1.15	

It may be observed that the subjects of maximum number of meetings held in both the years pertained to the classes 3 and 5/6 i.e. social sciences and; science and technology Although meetings as a forum of information communication is more popular among the social scientists and scientific research community, it is also becoming popular among research communities in other disciplines as is abvious from the percentage increase in meetings held in 1967 over those held in 1962 in the disciplines other than social sciences; and science and technology.

Analysis of Quantity of Material Produced: A break up of reports by page grouping has been done and is shown in Table - 5.

Table-5: Break up of reports of meetings held in 1962 and 1967

Year	1-20p	21-50	51-100	101-200	201-300	301-500	501-700	701-900	900+	Un-p.	Total
1962	97	167	142	197	89	99	54	25	27	135	1032
No. of reports	←	406	→	←	286 →						
1967	161	184	149	187	104	102	42	27	20	315	1293
No. of reports	←	494	→	←	291 →						

Total page production 1962=1,96,500(406 x 50 + 286 x 200 + 99 x 400 + 54 x 600 + 25 x 800 + 27 x 1000).

" " " 1967=1,90,500(494 x 50 + 291 x 200 + 102 x 400 + 42 x 600 + 27 x 800 + 20 x 1000).

The maximum number of reports fall under the page group 101-200, being 197 in 1962 and 187 in 1967. It may however be commented that the average size of report also ranges from 101-200 pages. To determine the quantity of material produced, an average of 50 pages has been taken for the report produced collectively under the page groups 1-20, 21-50 and 51-100 pages; an average of 200 pages has been taken for those produced collectively under the page group 101-200 and 201-300 pages. Similar criteria have been applied in the case of other groups also. Each average has then been multipled by the number of reports produced in the corresponding groups resulting into the net output in forms of pages during a year. A total of 1.96,500 pages were produced in 1962 and 1,90,500 pages were produced in 1967. The decrease in the pages produced in 1967 from those produced in 1962 may be attributed to the fact that unpaginated reports produced in 1967 were far more than those produced in 1962 (135 such reports were produced in 1962 and 315 in 1967).

Publication Channel and Time Lag: By choosing six possible forms of presentation, an attempt has been made to determine how the reports of meetings find their way to the user community and with what speed. A break up of reports of meetings by forms, in which the publications first appear, and date of publication has been done and the result presented in Table 6.

Table-6: Break up of meetings held in 1962 and 1967 in terms of the forms of appearance and date of publication

Year	Serials only	Printed Monographs	Published Monographs/ Serials	Typewritten & Monographs	Typewritten & Monographs/ Serials	Total	%
1962							
Yr^{0}	97	202	21	45	18	383	55.84
Yr^{1}	42	158	9	4	2	215	31.34
Yr^{2}	5	44	-	-	-	49	7.13
Yr^{3+}	5	27	1	4	2	39	5.69
Total & %	149 21.72	431 62.83	31 4.52	53 7.73	22 3.2	686	
1967							
Yr^{0}	129	276	52	67	13	537	61.93
Yr^{1}	42	189	11	18	2	262	30.22
Yr^{2}	11	43	2	1	-	57	6.58
Yr^{3+}	2	9	-	-	-	11	1.27
Total & %	184 22.22	517 59.63	65 7.49	85 9.92	15 1.73	867	

Table 6A: Break up of reports by publishing bodies

Year	Institutional Publications	Commercial Publications	Publications in Serials	Total
1962	638 61.82%	164 15.89%	230 22.29%	1032
1967	776 60.01%	179 13.85%	338 26.14%	1293

The most common form in which the reports of meetings find their way to the user community is the printed monograph. The other forms in order of speed of publication are the serials, typewritten copies and other collective forms such as monographs and serials; and typewritten copies and serials.

The percentage of reports published in the monographic form has descreased from 62.83 in 1962 to 59.63 in 1967, while it has increased in the case of monographic/serials form from 4.52 in 1962 to 7.49 in 1967. There has however been no change in the percentage of publication published in serials. Increase in the percentage of publications produced in typescript form from 7.73 in 1962 to 9.92 in 1967 is because of the preference being given by the organisers to this form with a view to produce the reports speedily. Distribution of such reports is however limited only to the participants. It therefore, calls for greater responsibility on the part of organizers to get these reports published and make them available for wider circulation. Another conclusion drawn from Table 6 is that 40-50% meeting are convened and the time lag for them spreads from 1 to 2 years. The time lag for the remaining 50% of meetings vary from 3 years to more than three years.

Institutional and Commercial Publications: During both the years, the quantitative production by the organising bodies was greater than that of commercial publishers. It is remarkable to note that the percentage of meeting reports published in serials has considerably increased from 22.20% in 1962 to 26.14% in 1967 (Table 6A)/ The possible reason being that they serve as a primary source of periodic information and also provide unique opportunity to the contributors for updating the information.

Among the commercial publishers there is a monopolistic tendency in the publication of reports. A large proportion of publishing work is done by a few houses specailizing in congress reports and abstracts. Data in respect of the ten leading houses responsible for 40.85% of total commercial production in 1962 which rose to 43.59% in 1967 is given in Table 7.

Table-7: Break up of commercial publications brought out by leading houses

Year	Exerpta Medica	Karger	Elsevier	North-Holland	Springer-Verlag	Pergamon	Masson & Cie	Nij-Hoff	Academic Press	Butterworth	Total & %
1962	6	13	4	10	2	13	4	3	7	5	67 40.85
1967	23	18	11	9	6	6	6	5	2	2	88 43.59

Pergamon and Karger top the list of commercial publishers in 1962 each bringing out 13 out of 164 publications (8%). The first place in 1967 was taken by Experts Medica Foundation bringing 23 out of 179 publications (13%).

Language Analysis: A language break up of reports of meetings held in 1962 and 1967 has been done under six language categories and is shown in Table 8 (next page).

—A marked increase is revealed in the use of Spanish language, increasing from 4.75% in 1962 to 7.66% in 1967. Since commercial publishers produce most of the reports in English language , it is therefore quite natural to have maximum number of reports in this language.

Geographical Analysis: A geographical distribution of the meetings held in various countries has been done and is given in Annexure 1. There has been an increase in the number of countries playing host to meetings from 76 in 1962 to 91 in 1967. This increase may be attributed to the realisation on the part of the member countries of the fact that international meetings have an important role

Table-8: Language break up of reports of meetings held in 1962 and 1967

Language	Year	Institution Monographs/ Mimeographs etc.	Publishers published Monographs	Serials	Total	Percentage
English	1962	298	120	81	499	48.35
	1967	372	129	105	606	46.88
French	1962	157	11	82	250	24.22
	1967	167	13	120	300	23.12
English/French	1962	43	7	23	73	7.07
	1967	55	12	40	107	8.28
Spanish	1962	45	-	4	49	4.75
	1967	75	1	23	99	7.66
German	1962	17	9	-	26	2.52
	1967	14	6	5	25	1.94
Others & Mixed	1962	78	17	40	135	13.08
	1967	93	18	45	156	12.06
Total	1962	638	164	230	1032	
	1967	776	179	338	1293	

to play in the development of a country. A ranking of the various countries has been done according to the frequency of meetings held in 1962 and 1967 as shown in the Annexure with a view to assess their involvement in international meetings. It may be observed that France, the USA and Germany(FR) have played an active role in hosting large number of meetings in their countries. European countries have continued to be the leading countries in hosting maximum number of meetings inspite of the fact that the number has decreased from 14 in 1962 to 11 in 1967. France continues to be on the top of the lists of for both the years, with 93 meetings in 1962 and 92 in 1967. It is followed by the USA hosting 61 meetings in 1962 and 78 in 1967. Germany (FR) hosting 60 meetings in 1962 and 54 in 1967. There has been no change in their ranking. This may be because of the fact that the number of organising institutions having their headquaters, where most of the meetings take place, in these countries is more than in any other country having lesser frequency of meetings. A sample analysis of the organising institutions revealed that 165 institutions had their headquaters in France, 73 in Switzerland, 60 in the UK, 55 in Belgium, 51 in the USA, and 37 in the Netherlands. It is surprising that Germany (FR), which is the headquaters of only a small number of organisations, ranks third in both the lists. It may also be noted that countries like Switzerland, Canada, Spain, Netherland, Czechoslavakia, Japan, India and Israel, though rate after Germany (FR), yet have no less important positions in the ranking lists.

Conclusions and Suggestions

i) The increase in the number of meetings with passing of years reflects the importance of meeting as an important communication channel and there is an immediate need for the proper documentation of their reports especially in the fields of social sciences, and science and technology

ii) Although the most popular channel of disseminating meetings information is the published monograph, 7 to 10% of meetings information also first appear in the typewritten or memeographed form. This calls for additional responsibility on the part of organisers to give such reports wide circulation instead of limiting their distribution to the participants only.

iii) Serials as a medium of publication for reports is also becoming increasingly popular.

iv) Institutional publications outnumber the commercial publications in both the years viz. 1962 and 1967.

v) Whereas the publication of reports in Spanish language has increased, it has decreased in the cass of English and French language publications.

vi) The European countries continue to lead in playing hosts to international meetings.

vii) Only 60% of the meeting reports are brought out during the year in which the meetings are held.

Acknowledgement

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ANNEXURE 1

Rank 1967	Rank 1962	Country	No. of meetings held	
			1967	1962
1	1	France	92	93
2	2	USA	78	61
3	3	Germany (FR)	54	60
4	6	Switzerland	53	33
5	4	UK	46	48
6	4	Italy	44	48
7	9	Canada	38	21
8	7	Belgium	31	31
9	9	Spain	30	21
10	12	Netherlands	28	15
11	8	Austria	26	27
12	22	Czechoslovakia	20	6
12	11	Sweden	20	17
13	15	Japan	16	10
14	12	Denmark	14	15
15	20	India	11	7
15	25	Israel	11	5
16	22	Argentina	10	6
16	30	Hungary	10	4
16	16	Norway	10	9
17	25	Australia	9	5
17	25	Brazil	9	5
17	-	Yugoslavia	9	3
18	16	USSR	8	8
18	30	Turkey	8	4
19	-	Germany (DR)	7	-
19	20	Poland	7	7
19	-	Uruguay	7	2
20	25	Philippines	6	5
20	-	Rumania	6	2
20	-	Singapore	6	-
20	-	Thailand	6	2
20	-	Venezuela	6	-
21	25	Chile	5	5
21	22	Colombia	5	6
21	18	Greece	5	8
21	30	Finland	5	4
21	-	Luxemburg	5	-
21	-	Peru	5	1
22	-	Kenya	4	3
22	18	Portugal	4	8
23	-	Monaco	4	2
23	-	El Salvadar	4	2
24	-	Iran	4	1
24	-	Senegal	4	1
25	-	Congo	3	2
25	-	Costa Rico	3	2
25	-	Hong Kong	3	2
25	-	Ireland	3	1
25	-	Ivory Coast	3	-
25	-	Lebanon	3	1
25	-	Pakistan	3	1
25	-	Puerto Rico	3	1
26	-	Bulgaria	2	2
26	-	Iraq	2	-
26	-	Korea (Seul)	2	1
26	-	New Caleodonia	2	1
26	-	New Zealand	2	1
27	30	UAR	1	4

N. B.: Total number of meetings in 1962 = 686;
in 1967 = 867.

Total number of countries playing host
in 1962 = 76; in 1967 = 91

FOCUS ON UNISIST PROGRAMMES

This is the third instalment of this Feature. In this part, a report of the 1st Meeting of the UNISIST Steering Committee is presented. This is taken from the UNISIST Newsletter vol. 2 no. 1.

FIRST SESSION OF THE UNISIST STEERING COMMITTEE, PARIS, 5-9 NOVEMBER 1973

The Steering Committee is mainly responsible for guiding and supervising the planning and the implementation of the UNISIST programme; for assessing priorities among the various projects; for reviewing the results achieved and defining the basic areas requiring international co-operation and for making recommendations on the future programme.

The first session of the Steering Committee was held at Unesco Headquarters in Paris from 5 to 9 November 1973. The Agenda for this meeting included:

i) The examination of the UNISIST current programme and priority projects.

ii) The examination of the proposed outlines for the UNISIST medium-term programme for 1975-1980.

iii) The examination of proposals concerning Member States' support for activities under the programme.

iv) The co-operation with the intergovernmental and non-governmental organizations interested in the UNISIST programme.

I. Examination of the UNISIST Current Programme and Priority Projects

Under this item of the Agenda, eight projects, some of which have just been started or are still in a preparatory phase whilst others are already well under way, were presented for discussion. The results of the discussions are summarized as follows:

1. International Serials Data System (ISDS). The Secretariat described the main objectives of the project which was considered by most of the delegates to be an important and useful undertaking. It was felt that the Steering Committee should exercise a general responsibility for reviewing the progress of this international network as it should do for all international centres created within the framework of UNISIST.

It was felt to be important to consider how many of the products were needed in relation to the probable charges for them and at the same time recommended to restrict the coverage for some time to science and technology.

The discussion showed that the question of pricing policy needed close attention. There was no broad policy yet, though the exchange of information between the International Centre of ISDS in Paris and national or regional centres would be free of charge. The proposed Broad System of Ordering (BSO, see below) should be included as a data element in the "Guidelines for ISDS".

The Committee approved the action taken so far by Unesco in the creation of the International Centre and asked Member States to continue the establishment of national centres in accordance with the "Guidelines for ISDS".

2. Establishment of International Information Centres. When introducing the subject, the Secretariat described the main objectives of International Information Centres or Clearing Houses which should be created within the framework of UNISIST in order to ensure an

adequate information coverage of all possible aspects of information transfer related to the programme. These objectives are: to help to avoid duplication and insufficiencies in research and development on specific aspects of information transfer; provide information on advanced experiments and techniques; foster the implementation of new techniques and experiences in developing countries. In order to fulfil these objectives, each centre should provide the functions of information service, analysis, referral, advice and education, functions which may be phased in gradually as the centre grows.

Besides ISDS, three centres already exist; two clearing houses for scientific and technical classification schedules, keywords, descriptor lists and thesauri at Case Western Reserve University, Cleveland, Ohio, United States of America (English language) and I.I.N.T.E., Warsaw, Poland (other languages) and an International Information Centre for Terminology (INFORTERM) located at the Austrian Standards Institute in Vienna. Since the UNISIST Intergormental Conference in October 1971, a number of proposals have been made, mostly by Member States, to establish other international centres and Unesco is negotiating with several organizations and governments for the establishment of these centres.

There was general agreement among delegates that the proposal for the establishment of international information centres was sound in principle, but some doubts were expressed about the present method of procedure. It was proposed that, initially, the new centres should be confined to subjects of a conceptual nature namely, ISDS, standardization in documentation and information handling, terminology, bibliographic descriptions, etc.

3. World Machine-Readable Inventory of Abstracting and Indexing Services. This inventory may be considered as a first step towards the establishment of a world network of interconnected refrral services - one of the long-term objectives of the UNISIST programme. It will provide printed publications (guides and bibliographies) and other specialized services from an established data base and serve as a reference tool for librarians, documentalists and information specialists. The work started as a joint project of FID and NFAIS (National Federation of Abstracting and Indexing Services - United States of America). The final master file is expected to be completed by the end of 1974. A copy will be available in both Europe and the United States and special services will be available in both Europe and the United States and special services will be offered from the two files.

4. Broad System of Ordering (BSO). The main function of this system will be to serve as a switching mechanism between individual classifications and thesauri in the process of information transfer. It will be an essential tool for systems interconnexion (the improvement of which is one of the priority projects of the UNISIST programme) and will play a useful part in ISDS, the referral network and the operation of information systems.

Some delegates expressed doubts about the wisdom of introducing yet another broad scheme of classification to those already existing, however, it was explained that the main function of this new system would be to serve as a switching mechanism between existing schemes and that it was not to be considered as a new classification system.

The Committee recognized the usefulness of the project and the representative of UNIDO gave it firm support as being a means of helping developing countries to adopt more sophisticated information systems.

5. General concept of a UNISIST Manual for Systems Interconnexion. In order to make existing standards in documentation and information widely known and to promote their widespread use, it is intended to compile a Manual for Systems Interconnexion containing information on standards, rules, guidelines, directives and other means of normative character relevant to systems interconnexion. This Manual will comprise five chapters dealing respectively with bibliographic descriptions, conceptual treatment of documents, presentation of documents (or elements of them), reproduction of documents and mechanical treatment of information. Input would come from various sources, notably ISO/TC 46, former and existing UNISIST Working Groups and other groups working on similar subjects. It will probably take a loose-leaf form and be updated regularly. The compilation of such a Manual, being a long-range project, will be carried out phase by phase and its first draft is not to be expected before the end of 1974.

SHORT COMMUNICATION

The following note coming from an eminent research worker will be interesting to cataloguers. Keeping in mind the provisions of Rule 14 (original author or reviser) of the AACR and the relevant commentary on the question in the CCC, it would be profitable to note the viewpoint of an user on the question of entry of a revised work — Ed.

THE CORRECT CITATION OF TWO BOTANICAL REFERENCE WORKS

Willis' A Dictionary of Flowering Plants and Ferns (Cambridge University Press) is a work of constant reference and citation by research workers in various branches of Botany. As shown below, a great discrepancy and confusion prevails in citing the 7th edition of it, revised by Airy Shaw. To add weight to the argument, the examples selected are from foreign authors in foreign publications. Some authors quote this book in one way, while an equal number quote it in quite a different way. Some, like Rudolf Schmid in Amer. J. Bot., vol. 59, 1972, p. 434, cite it as below, giving Airy Shaw its authorship.

Airy Shaw, H.K. 1966. J.C. Willis' A dictionary of flowering plants and ferns. 7th edn., University Press, Cambridge.

Others, like Richard H. Eyde, in J. Arnold Arb., vol. 49, 1968, p. 192, cite the same edition showing Willis as the author:

Willis, J.C. 1966. A dictionary of flowering plants and ferns. 7th edn. rev. by H.K. Airy Shaw. University Press, Cambridge.

Only one of the above methods of citation can be correct. There is no doubt that Airy Shaw so completely changed and enlarged this edition that it is almost a new-work, with not much semblance to the original except the dictionary form. But still, the author of this dition is that person whom the publishers hemselves proclaim as such. The title page of this book clearly states:

A Dictionary of Flowering Plants and Ferns by J.C. Willis. Revised by H.K. Airy Shaw. When the publishers give so unambiguously the authorship to J.C. Willis, nobody has a right to quote the work under the authorship of Airy Shaw. The citation as given by Eyde is the correct one. Apart from the all important fact that according to the publishers, Willis is the author, if Airy Shaw is the author, it would be the first edition of his book and not the 7th edition of Willis' work.

A similar confusion and anamoly exists in the citations of another important reference work, namely the 12th edition (1964) of volume II of Engler's Syllabus der Pflanzenfamilien edited and revised by H. Melchior. In Bot. Jb. vol. 90, 1971, p. 445, Theo Eckardt cites it as:

Engler, A. 1964. A. Engler's Syllabus der Pflanzenfamilien. 12 Auf. Bd. II. etc.

This 12th edition of Engler's Syllabus is edited, revised completely, and enlarged by Melchior. There are some other collaborators also who have contributed certain sections of the book. If this work is cited under 'Melchior, H.', the name must be followed immediately by '(Ed.)' to indicate that he is the editor of the 12th edition of Engler's Syllabus. Or, it can be cited under the name of Engler, but clearly stating that the reference is to the edition edited by Melchior. If the reference is to a particular account written by some other collaborator and not by Melchior, the citation can be under the name of that collaborator, stating "In A. Engler's Syllabus... , 12th edn., edited by H. Melchior. A reference to an account written by Melchior himself in this work can similarly be cited under the name of Melchior himself, but again clearly stating as "In A. Engler's Syllabus etc."

The title page of the second volume of the work under consideration reads as follows: A. Engler's Syllabus der Pflanzenfamilien mit besonderer Berucksichtigung der Nutzpflanzen nebst einer Ubersicht uber die Florenreiche und Florengebiete der Erde. Zwolfte, vollig neugestaltete Auflage herausgegeben von Prof. Dr. Hans Melchior II Band.... On the outer hard cover it simply states -"Engler - Syllabus der Pflanzenfamilien II".

Wrong citations of the titles and authors of books arise when research workers do not bother to consult the originals themselves, but take the citation second hand from another published paper where a mistake has already been committed.

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RENDERING OF AN EXTRACT IN THE CLASSIFIED CATALOGUE CODE

An extract has been defined as "A document which embodies a portion of another document". (Classified Catalogue Code Edn 5, 1964 (FJ2)). For better clarity the definition may be rewritten as follows:

"A (micro) document which embodies a portion of another (host) (macro) document". Legion of such micro documents can be located in simple, ordinary composite and artificial composite books. These micro documents require to be brought to the attention of the readers especially the researchers. But most of these are lost sight of in a library. Moreover, in the day to day work of cataloguing books in an ordinary library, the need for this extra exercise scarcely arises due either to the lack of demand or the cost of supply. In a research library the need to bring such micro documents to the attention of the researchers is very great. This is done through providing a special entry known as the Extract entry.

An extract entry is in fact a cross reference entry with a difference. A cross reference is preferred where the micro document embodies a very small portion of a host macro document, but is inseparable from the latter for the reason that the micro document has no specific title or identity. An extract entry is preferred when the micro document embodies a portion of the host macro document, but is quite distinct and is capable of forming an entity by itself. Moreover a cross reference is given in a catalogue of a particular library where the host document is available. The example provided in MF33 of CCC assumes that the host document is available in a particular library and the micro document has been issued and documented separately. This is done to make it clear that the (micro) document is only a portion of the (macro) document and is not an independent document by itself. But, in case the micro document is not available separately but is contained in the original macro document, it is possible to deal with this with an ordinary cross reference entry. Another distinction also be drawn. A (micro) document contained in a (macro) document which is a simple book may be disposed of with a cross reference entry. But in the case of a micro document contained in an ordinary composite book or an artificial composite book require to be treated differently. It has to be treated with an "extract entry". There is a very thin layer of difference which requires to be distinguished.

The need to give extract entry arises frequently in documentation work. The documentalist engaged in compiling a documentation list unearths a lot of micro-documents on the chosen topic from symposia, proceedings of conference, reports of ad hoc commissions and committees etc besides periodicals and ordinary books. This he is able to do, not by confining himself to the sources of a particular library but by extending his tentacles far and wide to as many libraries as he can possibly visit. If the provisions of MF33 of CCC were to be followed, he will be obliged to add the Call no. of the original or the host document. Where different libraries are organised with different classification schemes, the documentation list will become a hotch-potch with different call nos, rendering the uniform arrangement of the list impossible. The different call nos. serving as location marks will convert the documentation list into an union catalogue on the chosen topic, which it is not intended to be.

To prevent the hotch-potchiness of the documentation list, the documentalist has to be spared the necessity of adding the call number of the host document. Secondly the provisions contained in Rules MF33 prescribing different treatment to the micro-document according to the availability or otherwise of the host document in the librarv should be done away with.

Unlike a library catalogue, the documentation list transcends local variations. Therefore, the rules should prescribe a uniform practice for the treatment of the micro-document.

Dr. Ranganathan gives the following as an example for an extract entry.

Ranganathan (Shiyali Ramamrita) (1892).
Model library bill
Extract from Ranganathan (Shiyali Ramamrita)
Five laws of library science.

Except for the Connective words "Extract from", the entry does not appear to be one, but appear to be two entries. In this example we are in a quandry. Dr Ranganathan, in his "Theory of library catalogue", says that the entries should be in consonance with the grammar of the language. If we bear this instruction in mind, then, the words of the entries for the host document seem to be not in accordance with the rules of grammar. After the connective words "Extract from", the entry words for the host document should read as

(1) Ranganathan's Five laws of library science
or
(2) Five laws of library science by S R Ranganathan.
and NOT as
Ranganathan (S R):
Five laws of library science.

B2/76 Ashok Vihar II
Delhi - 52

C S Krishnamurthi

INFORMATION SYSTEMS AND PLANNING

Introduction

The organisation of human labour is primarily an economic, social and ideological problem. In an industrial organization apart from business, technical and scientific information, a manager needs ideological, socio-political, economic and organizational information. Presently, when society is interested in materialising values and objectives on the basis of formal plans there is a growing need for information. Planning and Information are closely related and one might even say that there is no planning without information. Slightly exaggerated but essentially true is the following definition of planning:

- collection of data concerning facts and prlblems;
- processing of data taking into consideration values, norms, objectives and other relevant information;
- distribution of information plans or alternative proposals to the decisions makers on various levels.

It is natural that in this connection the numerical/statistical information is the central element, but there is reason to keep in mind that there exists a great deal of important non-quantifiable information. This, for instance, includes the basic values and goals of society, which are difficult to define verbally.

Recent Activities

The need for information naturally leads the planning - oriented authorities to the idea that the collection of information also needs a systematic approach or planning.

Status of Data and Information in Planning

Planning is based on information. Information is based on data and the quality of information depends upon the arrangement of data. Decisions depend upon information. The effectiveness and quality of decisions depend upon the quality of information and its organization.

It is not easy to visualise the inter-relationship of decision making process and information. The word 'Data' is used for basic facts or raw material and the word 'Information for processed data. The following figures give a rough idea about the inter-relationship of Data - Information and decision making process:

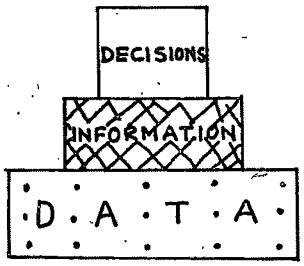

Fig. 1. Organised Data Base Ideal situation: The data is in a well organised form and hence the Information. Decisions are quick and effective.

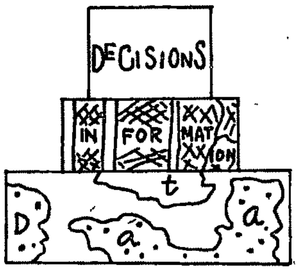

Fig. 2. Unorganised Data Base Scattered Data, Patchy Information, supports decisions occasionally. Decisions are delayed, faulty and ineffective.

Expert System

This is historically one of the oldest information system. The basic element of the system is the network of experts who communicate with each other - administrative authorities, scholars etc. The system is very valuable but bureaucratic or authoritarean type and is generally influenced by the opinions of few persons in key position. This process is normally based upon ad hoc surveys which are time consuming, expensive and generally do not give correct and adequate information.

Traditional Statistical System

This appears to be an archaic system in a modern expansive society. The information is a product of statistically processed data. The system is good enough for deductive planning/normative planning in which the decisions are based on certain norms and standards. The data is processed to provide statistical indicators which are compared against the set norms. This type of system helps the administrators who are neither specialist nor have time to form their own rules. Needs can be measured in terms of quality and quantity to formulate a practical policy; programmes and achievements can be compared whenever required. This system does not provide facility for analytical approach to the problems or guidance for priorities and also does not anticipate the future requirements. It mostly supplies conventional information rather than innovative information.

Integrated Problem-Oriented System - Data Bank

This fulfils the information requirements in a more complete manner. The planners and decision makers may have more efficient 'tailor - made' answers to their purposefully formulated questions. It provides a sufficient coverage to the policy makers for local or organizational planning. It serves more efficiently an organization which operates in a defined environment to achieve the set or assigned goals/objectives.

All Comprehensive Data Bank System

A comprehensive data bank system has no limits and serves 'The Big Brother' as well as the individuals. This is a most powerful autocratic system. The system is very useful in Inductive Planning. Inductive planning utilizes the skill of social scientists, economists, scientists and technologists; takes the help from the new disciplines like Operational Research, Mathematical Models, Simulation and Systems Engineering etc. The system is very flexible, suiting the modern society where Science and Technology progressing with unexpected speed. It utilizes all the modern techniques for data processing. It provides facility of exchanging data at wider levels - national and international, meeting the demands of more co-ordinated efforts.

International Scene

At the international level, the name of UNISIST would be worth mentioning. UNISIST is a joint project of UNESCO and ISCU, aiming to evolve a World-Science Information System, providing facility to exchange published and publishable scientific information and data among all countries.

The idea of a network of comprehensive data banks is taking ground nationally in several countries. The increase of exchanges of scientific and technical information between highly developed countries must inevitably benefit the developing countries.

Conclusion

It is important specially for the developing countries, that if they want to take the full benefit from such an international pool, they must first lay the foundations of their own data banks. The idea of establishing a comprehensive data bank system is most essential, if we need scientific and systematic planning to accomplish the best results in the present socio-economic conditions of our country.

Acknowledgements

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BOOK REVIEW

Encyclopaedia of Library and Information Science. New York, Marcel Dekker. Vol. 10- Ghana to Hong Kong. viii, 498p. 1973. ISBN 0-8247-2110-1 [Reviewed by B. Guha].

The range of this volume, Ghana to Hong Kong, displayed prominently on the spine, reminds one the case of a particular volume of a particular encyclopaedia where this alphabetical range happened to be between 'How to Hug'. The spine of the volume, needless to say, must have disappointed many young hearts, when it was away from the set.

However, between Ghana to Hong Kong we find quite a few interesting topics. Apart from the country survey articles on Ghana and Hong Kong, which are quite evident, there are articles on Greece, Guatemala, Guyana and Hawaii. There are a few biographical articles including one on H W Wilson. One of the most important articles in this volume is definitely a long article, running into more than hundred pages, on Government Publications (Documents). At the end of this article one would be delighted to see the name of James B Childs as the contributor. This article discusses the government publications of a number of countries arranged in alphabetical order.

There are a few articles on important libraries like Glasgow University Library, Harry S. Truman Library, Harvard University Library etc. There is one significant article on the literature of a subject and this is on Historical Literature.

There are at least two good articles on topics in other areas but which have become important for information workers also — they are Group Dynamics and Holography.

The above is only a sample of the contents of the tenth volume of the Encyclopaedia. It contains many more useful articles. It will easily meet the high expectations raised by the earlier volumes. It too is a rich argosy of facts, information, illustrations and good reading.

A mistake which was committed in earlier volumes and which can be easily corrected, continues in this volume also. Along with the names of the Advisory Board, Indian National Scientific Documentation Centre is shown to be located in Calcutta.

Classified Library of Congress Subject Headings, ed by James G Williams, Martha L. Manheimer and Jay E. Daily. New York, Marcel Dekker, 1972. 2v.

v.1 Classified list. viii, 32, 250p. ISBN 0-8247-6020-4

v.2 Alphabetic list. xi, 6, 486p. ISBN 0-8247-6020-4 $ 35.00

[Reviewed by B. Guha]

The Library of Congress has developed two indispensible tools for the subject analysis of books or a collection. They are the LC Classification Scheme and the LC List of Subject Headings. Due to a belief, which is traced back to Cutter, these two tools have remained completely separated. It was believed that "subject headings and classifications are different and achieve quite distinct methods of subject analysis without any relation to each other".

Thus, the classifier has been using the Classification Scheme mainly to 'mark and park' in the best possible way every new acquisition to the collection. Similarly, the cataloguer has been using the List of Subject Headings to provide the best alphabetical access to the contents of each document in the catalogue. They were used for two distinct purposes.

The present work has forged a link between these two great tools. The first volume presents in classified order the subject headings for which the Library of Congress has suggested numbers. The second volume is an alphabetical listing, with all the 'see' references, of the subject-headings. The class numbers are also given against each heading. The second volume, it is claimed can be used as the index to the Classification Scheme also. The entire work has been compiled from tapes supplied by the Library of Congress.

So far as the use of the work is concerned, it may be said it may be used by two groups of people — librarians and cataloguers and the user of the catalogue or the researcher. The usefulness of it to the first group of users is quite easy to see. The twin works of classification and cataloguing become, in effect, one if the present lists are used. But it is maintained that a researcher who wants to locate specific items with all related items, the present list will be a valuable tool for him. In short this list can provide him all the advantages of a classified catalogue.

As background to the entire project the advantages of a classified catalogue has been highlighted and explicitly mentioned in the Introduction. It would be worthwhile to quote a few lines here: "A library user accustomed to a classified catalog will find the dictionary catalog much less to his liking... The great libraries in the United States [using dictionary catalogues] would face a future incomparably bleak if the only choice available were between recataloging the library — regardless of its size — and continually increasing the annoyance of users as the collection grows. There is a middle way that can begin to solve these problems, and it is offered here in two volumes". It is really heartening to hear such praise of the classified catalogue from the land of the dictionary catalogue.

Those libraries where the LC Classification or the LC List of Subject Headings are used these two volumes will be most valuable additions.

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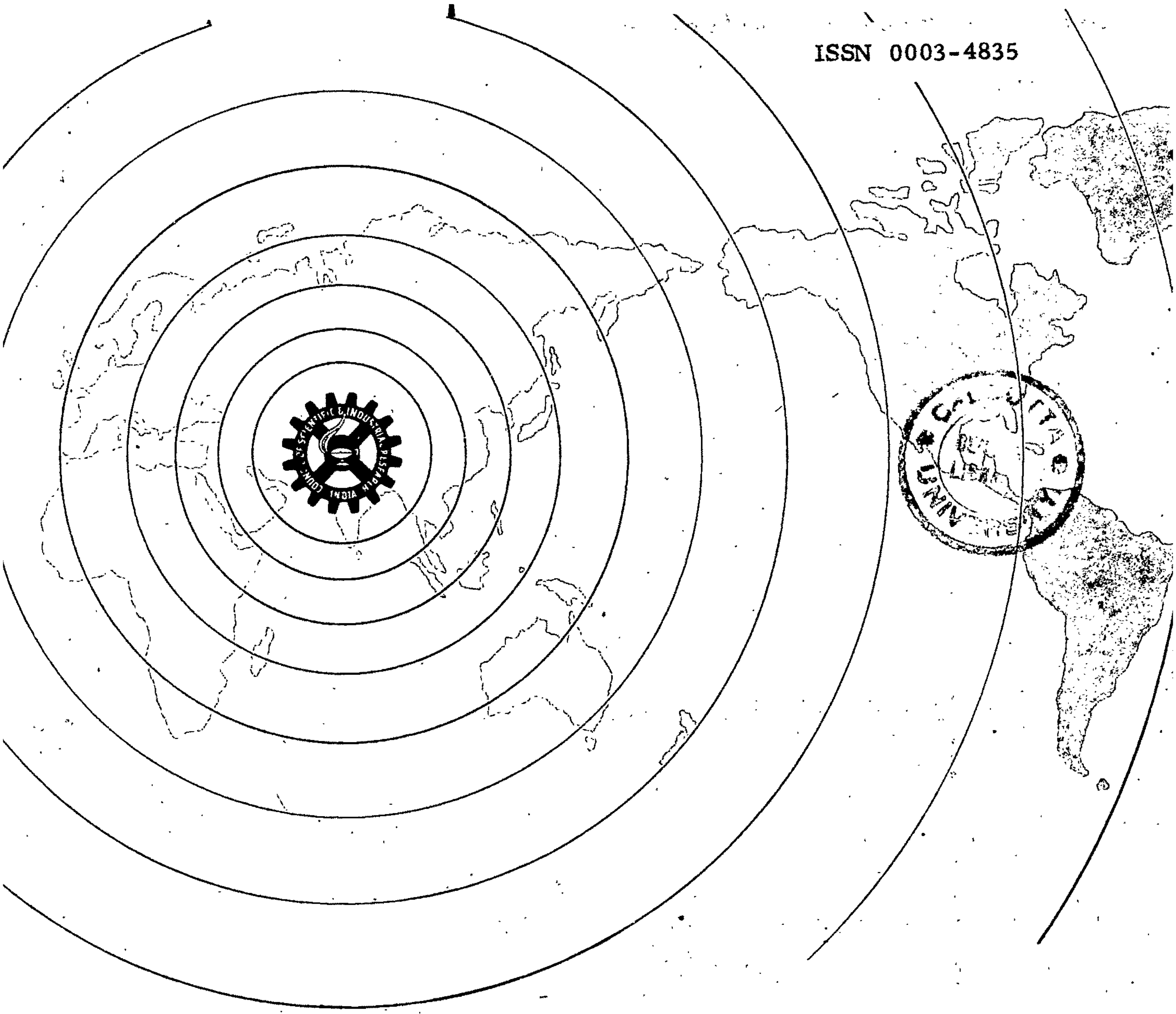

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BIBLIOGRAPHICAL REFERENCES: RANGANATHAN'S IDEAS AND PRACTICES

B Guha
INSDOC, New Delhi-12

The practice of citation is well established but the mode of citation is not yet standardised. This is an area where considerable efforts have been made to get into a standard practice. The subject could not escape Dr Ranganathan's attention and his analytical mind brought some fresh ideas to bear on it. The paper brings out Dr Ranganathan's ideas and practices in this respect and their gradual evolution.

Introduction

The practice of citing work previously published is quite common in scientific writing. The earliest mode of citing such a work was in the form of a footnote. Hence a bibliographical reference or citation is even now called a footnote. It appears that the lowly footnote has attained greater importance in recent years due to a number of reasons. It is quite natural that the practice of citation, its wide variations, possibilities of standardization, etc. did not escape Dr. Ranganathan's attention and his analytical mind brought some new ideas on this subject too as on many other subjects as is well known.

Plums of Sabari: Authors Bibliographies

We get perhaps the first significant pronouncement of Dr. Ranganathan on bibliographical citations in a passage deeply soaked in the sublimity of the great epic of the Ramayana. He wrote, "Readers constitute the ultimate consumers of the intellectual content of prints. Authors... are both consumers themselves and indirect helpers to the ultimate consumers. They have had to consume the literature cited by them in the very process of the creation or compilation of their own works. Fortunately, it has now become a healthy practice for such consumers to lay bare in their works an exhaustive list of all that they have consumed, for the benefit of their readers... this bye-product turns out to be of immense benefit to other consumers. In this, authors resemble Sabari who herself tasted everything in collecting offerings to the Lord-Shri Rama... Their bibliography is like the plums of Sabari, tasted by themselves and yet meant for distribution" [4]. Thus Dr. Ranganathan maintained that bibliographical references constituted a distinct type of bibliography - a bibliography created by authors. He named them 'Authors Bibliographies'. It is out of this conviction that he used in his own works, both books and articles, the term 'Bibliography' for the list of references cited. This was completely against the views of traditional bibliographers who refused to call any list of references a bibliography as the following quotation from Malclés would bring out the point. She maintained, "it is therefore improper to call the lists of works cited at the end of a book or article bibliographies. These are references to the texts consulted by the author, and not the systematically constructed bibliography of the subject [3]. Similarly, Paul Dunkin maintained, "A list of footnotes and a bibliography are different things because they serve different purposes... a bibliography can stand alone and, indeed, may be intended to do so... A list of footnotes ... cannot stand alone. and it is not expected to do so" [1]. However, to be in line with current usage, Dr. Ranganathan also changed over to the expression 'bibliographical references' in his later works.

But How to Cite

The aspects of the present subject that have attracted greater attention from all interested parties can all be grouped under the question - how to cite? Different aspects are - what elements of information should be there in each citation or how much to include, whether each element should be given in full for abbreviations are possible, what should be the sequence of elements in each citation, position of citation and lastly whether any standardization is possible in these matters. Dr Ranganathan had something to say on practically all these points.

How Much in a Citation

The question, how much to include in a citation depends to a large extent on the basic question of the purpose of a citation. This has been variously stated by different authors. Some would emphasise that a citation is an important message from the author to his readers. Hence it should be as complete as possible, even at the cost of some redundancy. Others believe that it should contain just enough details by which the referred-to document can be identified. Some would even advise a reference in almost a cryptic form. Even the titles of two recent articles clearly point out this difference of opinion. The titles are 'Happiness is a long footnote' by Paul S. Dunkin [1] and 'Misery is a short footnote, by Phyllis A Richmond [6]. Dunkin was a bit satirical in choosing that title. What he advocated was a short reference without any redundancy. To his pleadings Jesse Shera replied in his own inimitable way - "Paul is also against the principle of redundancy, and this too, he would seem to be at war with Nature, for our lives, our fortunes, and our sacred honor are filled with redundancy. Redundancy is built into man's very biological structure..." [1]. Phyllis Richmond said, "... The utter faith of scientists that librarians can find thing from their short footnotes is touching... A part of the current literature crisis... can be attributed to the use of super-short and cryptic footnotes, which hide sources rather than lead to them".

Much of the differences that have been projected above is due to the fact that a clear statement as to the purpose of a bibliographical reference has been lacking so far. Similarly, another source of difference has been the absence of a clear idea as to what a bibliographical reference should mean. When one pleads for a short citation, usually he has in mind a reference to a document made by an author is his own writing. The question is whether a bibliographical reference should mean only this type of reference or its meaning can be extended to include other types of references also. Dr Ranganathan's views on these points are available to us from two documents - one is the Indian Standard on the subject which reflects largely his views [2] and the other is an article published about two years after the standard [5]. In the next few sections we shall largely draw on these two documents.

Items of Information in a Citation

In the Indian standard, bibliographical reference has been defined as, "A sequence of items of information needed for enabling a reader to identify the document referred to. It may also include, when required, the character, scope, publisher, place of publication, price, etc., of the document". In the same document we are also told, "... a bibliographical reference should consist of sufficient data for the identification of the original publication". Thus in both the places the emphasis is on identification. Hence, the second sentence in the definition seems to be slightly out of context. If identification is the main objective why should information about the character, scope, etc. be there in a bibliographical reference? Identification is important, no doubt, but it appears, something more than that is required. Something was kept implicit. We find, this has been made explicit in the second document. In page 80 of the document appears in a tabular statement 'the items of information necessary for the identification, location, and evaluation of the referred-to document' (i.e. the cited document). In other words, it is accepted that a bibliographical reference should consist of sufficient data for the identification, location, and evaluation of the original publication. By location is actually meant the locus in the host document. Items of information for evaluation may be physical factors like format, number of pages, inclusive pages in case of a part of document, typography, etc. and also author's designation and place of work, annotation, abstract, etc. for evaluation of the thought content.

Place of Occurrence of a Citation

According to the Indian Standard a bibliographical reference may occur in a document:

a) in the body of text;
b) in a footnote;
c) partly in the body of the text and partly in a footnote;
d) at the end of the text or its chapters or sections;
e) in an entry of an abstracting or indexing list or periodical, or a documentation list; or
f) at the beginning or end of a review.

In the second document also a similar statement has been given with a few more permutations got out of the combinations of, in the text, in a footnote, and at the end of text mainly. A look at the above six types of references will reveal that actually they belong to two broad categories. The first four types (a to d) refer to references made by an author in the referring document which are meant for his readers, who, one can expect, will be more or less within the same profession. Moreover, most of the items of references will be already known to many of the readers. Hence, items of information in such references could be less and just enough for identification.

The last two types (e and f) of references are of a different category. They refer to citations in abstracting and indexing or bibliographical lists and reviews. The essential characteristics of such citations are that most of the documents being referred to are new and are being introduced for the first time and these lists are not only used by specialists but by others also, like librarians, documentalists, bibliographers, etc. Hence apart from identification, references should contain enough details for their location and evaluation.

Indian Standard Recommendations

The above has exactly been the line of thinking as can be seen from the recommendations of the Indian Standard and this has been made more explicit in the article (the second document). When this distinction is realised and accepted, one can easily appreciate the recommendations of the Indian standard. The standard has actually two sets of rules for citing each type of documents. For example, an article in a periodical can be cited by an author in his own work and the same article can also come as a citation in an abstracting and indexing periodical or list. But the items of information in the citation for the same document will be different in the two cases. As we have already seen, in the former case the emphasis in on identification, hence the citation can be shorter than the second case where the items of information for location and evaluation are also prescribed. Thus the following are the items of information to be mentioned for referring a contribution to a periodical (article):

Other than one in abstracting or indexing list or periodical (A)	In an abstracting or indexing list or periodical (B)
a) Name(s) of author(s);	a) Name(s) of author(s);
b) Title of contribution shortened, if necessary;	*b) Name of institution where the work is done, in parenthesis;
c) Title of the periodical, alongwith the name of sponsor if inseparable from the title or if necessary for identification, abbreviated if desired;	*c) Address of author;
d) Volume number;	d) Title of document;
e) Issue number, if each individual issue in a volume is pagninated independently;	*e) Translated title, in parenthesis;
f) Year;	f) Title of periodical in which the contribution occurs, in an abbreviated form;
*g) Date of issue;	g) Volume number;
h) Page(s) - first and last pages in inclusive notation; or specification of place of occurrence...	h) Issue number, whenever each individual issue in a volume is paginated independently;
*j) Occurrence of plates;	j) Year;
*k) Occurrence of bibliography	*k) Date of issue;
*m) Occurrence of the synopsis/abstracts in a language other than that of the article;	m) Page(s) - first and last pages in inclusive notation;
	*n) Occurrence of plates
	*p) Occurrence of bibliography
	*q) Occurrence of synopsis/abstracts in a language other than that of the article;

* Indicates that the items are optional.

Thus we find from the above table that three additional items have been prescribed for a reference in an abstracting or indexing list or periodical. These are b) name of institution..., c) address of author, and e) translated title. The first of these items is obviously prescribed for evaluation. The second item is for facilitating direct contact with the author for any clarification, further information on the subject of the contribution, or for getting a reprint. The third item is again for evaluation. Similarly, the difference in emphasis in items (c) of A and (f) of B is also noticable. In the former case, the title of the periodical is prescribed to be properly identified and abbreviation is recommended only when desired. But in the latter case abbreviation is positively prescribed. It can be easily realised that this will secure considerable economy for an abstracting/indexing periodical and complete identification of each title is still possible with the insertion of a list of titles with respective abbreviations. This is exactly what is done in most of the abstracting/indexing publications. A slight difference in the prescription of items (h) of A and (m) of B can also be easily explained.

The Indian Standard states that "the amount of information essential will depend upon the nature of the publication cited". This is quite understandable. but what has not been explicitly stated is that the amount of information essential, in a bibliographical reference, depends also upon the nature of the publication (through it the purpose also) where the citation is made - i. e., whether the citing document is an abstracting/indexing or any other bibliographical lists or it is any other type of document.

Style of Citation of Dr Ranganathan

Now we come to consider another aspect of Dr Ranganathan's contribution towards standardisation of bibliographical references. This is more towards evolving a distinct style of reference. Even when some agreement is reached on the question of items of information to be contained in a reference there may be widespread difference on the question of how to make a reference. Here the rpoblems are — where to cite the reference, in the text, footnote, or at the end of the text, what should be the device for linking a reference to its actual place of mention in the text (if the reference itself is not in the text), the internal arrangement of the reference if they are grouped together at the end of the text, etc. The previous two documents do not recommend anything on these points. To get an idea of Dr Ranganathan's view on these points, we have to see his own style and practice of citation. So far as place of occurrence of bibliographical reference is concerned he has used different styles. In both his *Five laws* (1931) and *Reference Service* and *Bibliography* (1940) references occur as footnotes. In the *Prolegomena* (ed. 2, 1957) references occur within the text. But in most of his later works references occur at the end of the whole text, including the 3rd edition of the *Prolegomena* (1967). As has been mentioned already Dr Ranganathan introduced the list of references, at the end of text, as 'Bibliography' in his earlier works (even as late as 1961) but changed over to the expression 'Bibliographical references' in his later works. The device for linking has always been the use of numbers. In the earlier works it was superscript numbers but later on it was changed to numbers in square brackets. The internal arrangement of the references was in alphabetical order by the headings of entries. It can be mentioned here that inspite of the change of name to bibliographical references, Dr Ranganathan did not give up his earlier stand that a list of references is a type of bibliography. As a clear proof to this contention a note inserted at the beginning of the 'bibliographical references' of the 3rd edition of the *Prolegomena* can be cited. It reads, "This *bibliography* lists only the documents used by the author of this book". (emphasis supplied).

Three-Column-Reference System

The most significant contribution of Dr. Ranganathan in the matter of style of reference has been his method of what may be called 'three-column-reference'. We are reproducing below some entries from the 'Bibliographical references' of the 3rd edition of the *Prolegomena* which clearly brings out the 'three-column-reference' system and also some other characteristics

BIBLIOGRAPHICAL REFERENCES

Note.—

1 The entries in this list should be taken as supplement to those in the succeeding Index.

2 Whenever the same author is referred to more than once, the reference is made "expressive" with the help of the abbreviations
qirt = quoted in relation to; and
rirt = referred in relation to.

3 This bibliography lists only the documents used by the author of this book.

4 Column 1 gives the serial number by which the document is indicated in the text.

5 Column 2 gives the number of the section in the text, where the reference to the document is made.

1	Sec ME3	ABDUL RAHMAN, AFROZE FATHIMA, and RANGANATHAN (T). Screw production engineering. (Lib sc. 1; 1964; Paper B).
2	Sec LC31	ABDUL RAHMAN and RANGANATHAN (T). Extrapolation in arrays. (An lib sc. 10;1963; Paper C). *qirt* Number of open arrays in DC Ed 16.
3	Sec KC2	—. Non-seminal mnemonics. (An lib sc. 9; 1962; Sec A42). *qirt* Parallel schedules in CC.
4	Sec GA44	AMERICAN LIBRARY ASSOCIATION. List of subject headings for use in dictionary catalogue. 1895. *rirt* Difference in meanings of synonyms.
	Sec HA3	—. *rirt* Effect of synonyms in alphabetical sequence.
5	Sec XH4	ANNALS, Indian Library Association. 2;1952; 154-6, 173-191, 217, 233-42, 246-55. 3;1953; 1-6, 177.
6	Sec GA6	ATHERTON (P), *Ed.* Classification research: Proceedings of the Second International Study Conference on Classification (Elsinore) (1964). 1965. P 541. *rirt* International Standards Organisation.
7	Sec AD62	—.—. P 544-8. *rirt* Review of classificatory thought.
8	Sec HD7	—.—. P 545. *rirt* Faceted classification.
8A	Sec XL72	—.—. P 548. *rirt* Periodical seminars on classification.

The above excerpt brings out a few interesting characteristics. It can be seen that the references are arranged alphabetically by the headings and the serial numbers (column 1) are assigned after freezing the arrangement. The second column introduces the number of the section in the text where the reference to the document is made. This, of course, presupposes that chapters, sections, and paragraphs in the text are separately numbered. The third section, not only provides the full reference of the document but also mentions in what context it has been referred to. It can be realised that this style not only allows a reader to come from the text to the full reference very easily (with the help of the serial number) but also provides easy access from a reference to its place of mention in the text. In other words this style of reference provides two-way access. It is this quality that has a great promise. In view of the prevalence of a concept like bibliographic coupling and the existence of a tool like the Science Citation Index, the bibliographical references have not only attained greater importance in a number of ways but they have also influenced our views about their possibilities. After locating a document through a citation index it becomes a problem at times to find out the exact place of reference and thus see the exact nature of the 'association of ideas' between the citing and the cited document. In such a situation the second column can easily lead one to the exact place of reference. In other words a document can also be 'read', if we may say so, from the end.

Free from Roman Legions

Another characteristic of Dr. Ranganathan's style, that we would like to point out, is that the list of references is delightfully free from those cryptic Roman legions like ibid, op. cit, loc. cit, etc. Dr Shera said about this practice, "... since our friend [Paul Dunkin] was determined to break a crusading lance in defense of sanity in scholarship, we wish he had hurled his spear against the Roman legions of ibid, op.cit., loc.cit., infra, supra, and passim." About the same legions Jane Apostol in her poem 'Scholar's Choler's vividly portrayed the woe of a reader in the following stanza:

"Infra, ibid, vid, viz.
I chase each reference till I'am diz
Zy down the restless page, then fall
With ante, post, passim, et al."

Bibliographical References

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PLANNING OF INFORMATION SYSTEM FOR PETROLEUM INDUSTRY

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Petroleum industry is a complex one in its technical scientific and managerial activities. Growing inventions, innovations, social and economic pressures, necessity to avoid fragmentation and waste, and challenging information technology call for a systematic and planned approach to design of an information system. Techniques and standards of planning an information system are discussed in brief. This paper deals with a system suitable for the petroleum industry excluding refining and petro-chemical aspects.

1 INTRODUCTION

It is said that of all the information printed in the world since the industrial revolution, half has been generated and printed during the last decade only and current rate of its generation is simply unimaginative. It calls for immediate attention to consider the following points:

Firstly, a wealth of information that lies unused because the man who could put it to work has never seen it, perhaps does not even know that it exists and has no easy access to find out about its existence. This inability to get expeditiously the essential information is leading to enormous intellectual and social wastage, which no industry, no institution or organization could either escape or afford.

Secondly, obsolescence results to our busy veterans whose vast experience only offsets the advantages of our more recent graduates.

Thirdly, for any person, be a scientist, teacher, engineer, operator or administrator, only a very small percentage of all the information being generated will be relevant and important to his work and intellectual development. Only a strong information system can protect him from being deluged with the rest of the lot.

2 OBJECTIVES:

An information system is a subsystem of the whole organization consisting the following inter-dependent sub-systems:

Library System, Documentation, and Administration.

Before we discuss the policy as how to plan the system, it would be desirable first to establish its objectives:

1. To improve the means of access to the information and concepts preserved in the printed words or to say it differently, more elaborately to set the "Information" to motion by putting it in the active process of being communicated or transferred from one person, groups or organizations (Senders) to one or more other persons, groups or organizations (Receivers). It may be said that 'Value depends on the Transfer Process'. This statement satisfies the First law "Information is for use". Transfer should be pinpointed i. e., every person must get information of his interest; exhaustive i. e., every bit of information which may be of interest to a potential user, must be accessible and available to its user; expeditious i. e., without loss of time, information should be transferred to its user; users time in getting his required information should be saved, keeping in view that every moment, new ideas are being generated throughout the world.

2. Securing the partnership in R. & D., it should stimulate new thinking for industrial innovation; and

3. As an ingradient, it has to assist in decision making at levels of research and technical management.

3. PETROLEUM INDUSTRY IN INDIA

Petroleum industry plays a very important role in the development of both national and international economy. It has its own unique impact on political and social life. Technically speaking the development of petroleum industry needs a well planned and organised scientific communication system because of the following reasons:

(i). Petroleum industry is an industry of complex activities (— scientific, technical and managerial which includes:

(a). Exploration: Geological, geochemical and geophyscial exploration for hydrocarbon prospects; information in environmental sciences, such as geology, geophysics etc. is generated at a faster rate than its use and application.

(b) Drilling: Shallow and deep drilling; drilling on land and its offshore areas;

(c) Production: Reserve estimates, production and exploitation of oil and gas;

(d) Engineering: Planning and designing of drilling, production and transportation installations;

(e) Marketing;

(f) Research and Development; and

(g) Management: Petroleum economics, petroleum contracts, leases and legal aspects.

(ii) The above activities, either jointly or independently are being looked after by the O.N.G.C., I.O.C., Engineering India Ltd., I.I.P. etc.

These organisations have not unfortunately been able to plan and develop proper information system for their scientists.

(iii) Most of the personnel of these organisations are usually scattered and posted at various places on project sites and as field crews, who, do not have any access to any kind of literature.

(iv) The amount of internal generation of information in the petroleum industry engaged in exploration and production activities, is very large which is being accumulated every moment.

Considering the above points and that the fact that technical/scientific literature in all the disciplines is exponentially increasing, it becomes very essential to keep all the scientific, technical and managerial personnel, informed with the latest development in their respective fields, if the best results are to be achieved.

An information system with an industry is a very essential component of the whole. It is as necessary as the raw material to the industry and the laboratory and equipment to the scientist. This need has been felt since quite some time and became evident following the World War II.

4 PLANNING

Here, planning is concerned with developing the already existing system comprising library and documentation services, by filling the gaps and identifying the areas of developments and modifications.

41 Who Plans ?

To develop a suitable system for an organization like the ONGC, a much closer collaboration among the men of knowledge (scientist/intellectual reserves of the organization), innovators (persons utilizing the ideas for commercial production - engineers and technologists), the communicators (librarians, documentalists and information scientists) and system engineers, is imperative. Interdisciplinary, cross-cultural and multi-professional kind of effort requires that communicators seek cooperation in framing the information in such forms that it can be transmitted more easily and more understandingly.

42 How to Plan ?

Planning means, studying the goals and objectives of the system; calculating the costs, utilities and needs in relation to the environment in which it functions. Following points may be considered in this regard:

421 INTERNAL RESEARCH: A system does not work in isolation, its environment should be clearly established.

Establish clearly the environment in which the system operates; social, economic and educational standards; present assessment of needs of the organisation involves three 'I's Information, Impressions, and Ideas within the organisation. This is a constant and continuing effort. Modifications, changes and the development of the system depends upon the working of the organisation, its environment and policies. Future projections are necessary to be estimated as greater coordination between all types of libraries are expected at international level. All the organisations should plan their system in such a way that they may take the full benefit of the World Information System (UNISIST).

How to do ?

1. Establish the aims and objectives of the organisation
2. Recognise the personalities/personnel at all levels who are to be served by the system.
    21. By determining their educational standards,
    22. By determining their professional background,
    23. By determining their experience and;
    24. By determining their particular special interests etc.

Users are the customers of the outputs of the system; develop perfect users' profiles which are to be updated from time to time. Development of good users' profiles ensures the utility and future development of the system.

3. Research activities,

4. Development activities,

5. Production/operational activities,

6. Problems, prospects, future plans etc.,

7. Areas of innovations (developments elsewhere in the world may be of likely interest to the organisation).

8. Establish scientific, technical and economic environment of the industry in particular, national and International in general; it is important to mark the areas of fluctuations at any time due to the socio-economic or political changes:

9. With the integrated study of points 1-8 mentioned above, formulate the operating principles of the system: Objectives, Philosophy, Policies, and Procedures.

Thus internal research would determine the main components - inputs (documents) and processing techniques (involves the technical processing system, persons supporting or operating in the information system), control (policies, decisions for inputs, outputs as well as for processing) and outputs (services by the systems).

422. INTEGRATION WITH POLICY: While planning an information system for an organisation it must be kept in view that this system be treated as an integrated part of the main system of the organisation as a matter of policy.

43 PROCESS OF PLANNING:

Preliminary Studies:

(a) Existing system: Analyse the nature, structure and functioning of the present system. Determine its areas of developments, services which require improvements or modifications; services which presently do not exist but may be required; and thus determine all the gaps on the basis of what exists and what is required in accordance to areas established/marked as suggested in the section.

(b) Review of Acquired Experience

All experience acquired by others on similar system must be thoroughly studied for planning a system or improving an old system. Collect all information regarding similar systems:

1. By scanning through the available literature and examining the proposals, recommendations etc. made by professionals and experts:

2. By obtaining the views of specialists - librarians, documentalists, information scientists, system engineers and economists;

3. By examining the reports of expert institutions;

4. By inviting the experts and discussing with them the problems on the spot.

5. Visiting other organisations and thus comparing their services with the own system.

All these information should be well documented, analysed and interpreted within the limits of own framework.

(c) Techniques of Planning:

1. Surveys: Users' surveys: It is necessary to establish the individual needs, interests specialisation and capacity of assimilating particular type of information. For this purpose surveys are to be conducted for their reading habits, literature, consulting habits, their behaviour and reactions towards the various library services. The surveys can be conducted by evolving suitable questionnaires and personal contacts and interviews.

2. Observations: General.

21. Present structure of the system and its status and reorganisation.

22. Causes for inefficient working of the system.

23. Links between research institutes, similar organisations and their information centres in India and abroad (NGRI, GSI, NMDC, IFP, AIP etc.) This determines the interrelationship of the system and mechanism of co-ordination of services.

24. Professional standards of persons working at various levels in the present system — librarians, documentalists, information workers etc. and

25. Technical processing techniques and standard.

3. Observation: Specific

31. Population of organisation by category.

32. Number of potential users of the system

4. Documents:

No. of documents:

Books.
Periodical.
Others.
Annual additions.
Annual losses.

No. of documents by average date of publications.

1973 ---------

1972 ---------

1971 ---------

By subjects:

By reference works etc.

----

5. Building:

Space: ------------sq. ft.

Convenience. ------

Cleanliness:

Extensionable:

Suitable/unsuitable.

6. Furniture/Equipment:

Quality:

Reprographic equipment:

1. ----------
2. ----------
3. ----------

Printing:

Micro filming.

Binding

7. Technical organisation:

Type of Library. ----------

Selection Policy. ----------

Acquisition

Technical processing.

Classification scheme. ---------

Cataloguing code. --------------

Services.

Coordination and liaison with -------

---------------------------- Names of other organizations

Adequacy to meet the demand of:

Operators,

Engineers,
Scientists,

Managers and

Other users of the system.

Continuing education scheme for the people working with the system.

8. Budget (Annual)

Actual expenditure of industry.

Actual expenditure of R&D activities.

Actual expenditure of information system

on documents	% of IS.
on books	% of document.
on periodicals	% "
other documents	% "
on staffing	% of IS.
on building	% of IS.
on maintenance	% of IS

Capital expenditure
Recurrent expenditure
% of R&D with main organisation.
% of Information system with M.O.
Per capita expenditure

Ideal Research Library: Estimated standard costs in Dollars:-

	Initial costs	Annual costs (Recurring) Per 100 Research workers
Building	17,250	
Books:	150,000	15,000
Furniture/ Equipment	37,500	3,750
Staff		28,125

9 Feedback Mechanism (External research)

It is to be ascertained if there exists any feedback mechanism in the system so that it may improve whenever necessary for its better and efficient services. Evolution of services provided by the systems within the set objectives is very necessary to tune the system with the fast changing environment.

44 Determination of Requirements

With the help of techniques as described in the last paragraphs 42 and 43, it is possible to determine as to what services are needed for research and development, continuing education, operations, management and other activities of the organisation. It also determines the levels and standards of the services and users, keeping in view technical, scientific and economic development trends at national and international levels. It also makes it possible to determine the range and depth of subjects/disciplines.

45 Implementation

Once the aims, objectives and options for the information system have been defined; the studies, surveys and observations are completed, and needs ascertained, and costed; the development plan is ready with due regards to both future and existing conditions. The plan may be put up to the management for implementation. There should not be any difficulty in its useful implementation if the proposed system is on a realistic pattern and is in tune with the technical and scientific advancement coupled with the estimated economic growth.

5 Conclusions: Recommendations

Structure and functioning of the present system available with the Indian petroleum industry is very much inefficient and needs proper planning to bring it in phase with the present day advancements in various spheres. Taking the help of proposed techniques, a proper documents structure, staff and equipment structure etc. can be worked out.

For the moment, it is proposed that the petroleum industry should immediately start its own complementary services making full use of currently available specialised international services. The University of Tulsa and the American Institute of Petroleum have been serving the petroleum industries in cooperative manner by providing them comprehensive and exhaustive abstracting and Indexing services which encapsulate current technological developments and facilitate disseminating large amounts of information quickly and conveniently. Since we in India are not utilizing these facilities, it is our urgent need to use the existing systems and gradually develop our own system as per our specific needs.

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ON THE CONSTRUCTION OF A DESCRIPTOR MODEL

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The linguistic and the logical aspects of a system of descriptor language suitable for information retrieval are discussed.

This study has resulted from the investigation of the semantic aspects of a descriptor Information Retrieval Language (IRL), which was undertaken to determine the range of its semantic power. This investigation trend is in full concordance with the UNISIST Recommendations [1], which draw information workers' attention tothe necessity of exploring more sophisticated methods of translation from indexing to natural languages.

1. Definition of Descriptor

The efficiency of the IRL is determined by its semantic power, i.e. by its ability to express the content of any document fully and precisely. The semantic power of the IRL depends on the degree of development of its paradigmatic and syntagmatic relations [2], and also on the completeness of concept composition. Therefore, the criteria for the semantic power of the IRL are the following:

1) degree of differentiation of paradigmatic relations in the IRL;

2) degree of differentiation of syntagmatic relations in the IRL;

3) completeness of concept composition.

Dependence of the semantic power of the IRL on the degree of differentiation of paradigmatic and syntagmatic relations between lexical units is reflected in the changes of the parameters of the IRL. Thus, the recall ratio is increased if paradigmatic relations between descriptors are used in indexing (e.g. generic and specific relations, "unit-part" relations, associative relations). The precision ratio is increased if syntagmatic relations between descriptors are used in indexing, i.e. grammatical means, such as links and/or roles, are used.

Dependence of the semantic power of the IRL on the degree of differentiation of paradigmatic and syntagmatic relations betweend escriptors is being widely discussed in literature [3, 4]. As far as the completeness of concept composition is concerned, it is less developed. The completeness of concept composition is characterized by the representativeness of terms and by the interlanguage (natural language IRL) coordination of concepts.

The completeness of concept composition is also determined by the descriptor model and by the mode of its construction.

The main task of this study is to work out such a definition of descriptor as would meet the requirements of semantically powerful IRL and, in particular, of criterion 3, i.e. the completeness of concept composition.

The construction of descriptors reflects synonymous and syntagmatic relations of lexical units of the natural language.

In practice, the mode of construction and a formal model of descriptor do not always help express synonymous relations typical of a natural language. While constructing a descriptor on the basis of its model, which does not reflect adequately synonymous relations of a natural language, a pre-coordination of concepts occurs in the descriptor itself. The coordination of such concepts is not characteristic of a natural language, for synonymous relations do not form a syntagma in it.

So we can conclude that descriptor languages with pre-coordination of concepts, formed by reflecting synonymous relations of the natural language, can be placed on the border of pre-coordinated and post-coordinated IRL and may be divided according to this criterion as semantically strong and semantically weak. In other words, descriptor languages with more adequate reflection of synonymous relations are semantically stronger as they can define the meaning of any communication more precisely and do not decrease the recall ratio. The construction of descriptors with more adequate reflection of the synonymous relations of the natural language reflects the concepts of the natural language more fully and precisely (for the differentiation of concepts is more elaborate).

Syntagmatic relations, i.e. all kinds of links between lexical units, are reflected in descriptor languages which include word combinations.

Post-coordinated IRL are semantically more powerful than those pre-coordinated, as their completeness of concept composition is potentially higher.

Descriptor IRL's are not pre-coordinated despite the fact that links are expressed in their vocabulary as syntagmatic relations permitted by the rules of processing of key words [3, pp 22-25] and coordinate words of the natural language, but that does not lead to concept coordination. Links may occur in fixed word combination and phraseological units which form a concept, i.e. a term [6]. For instance, the word combination "Loss factor" and "Scientific information" are included in the thesaurus in addition to the terms "Factor" and "Information", as they express different concepts. The thesaurus may also include free word combinations which are used so frequently that their replacement each time by a list of words becomes uneconomical. But the number of such word combinations is very small as compared to words and fixed word combinations included in the thesaurus. If we neglect free word combinations, then the following conclusion is true. There is no pre-coordination of concepts in the thesaurus that reflects syntagmatic relations permitted by the rules of lexicographic processing of key words.

Such descriptor IRL's are post-coordinated as they have only indivisible concepts. If the number of free word combinations if not limited by the rules of lexicographic processing of key words, then the thesaurus will increase in bulk.

So, to obtain the maximal completeness of the thesaurus concept composition and to minimize its volume one has to include in it only words and word combinations that express indivisible concepts.

Descriptor as a class of elements is an explication of interlanguage concept coordination corresponding to synonymy relation in the natural language.

Descriptor construction is understood as the formation of a class (set) of elements which reflects synonymy of the natural language; a descriptor is constructed in such a way that an IRL with minimal number of descriptors would permit to index the meaning of any communication fully and precisely. Such a definition enables us to consider a descriptor to be a base of division in constructing a descriptor IRL.

2. Mathematical Model of Descriptor and Thesaurus Vocabulary

Descriptors are usually presented in IR Thesaurus as classes of conditional equivalence. These classes are constructed on the basis of the mathematical model of a descriptor, i.e. a class of equivalence. This is a class of equivalent elements which form a system of non-empty subsets $\{\mathcal{M}_1, \mathcal{M}_a \cdots\}$ of the set $\mathbf{M}$ that is called partition if

$$1)\ \mathbf{M} = \mathcal{M}_1 \cup \mathcal{M}_2 \cup \cdots \quad \text{and}$$
$$2)\ \mathcal{M}_i \cap \mathcal{M}_j \qquad = \emptyset \text{ and } i \neq j$$

This model does not describe the synonymy relation for a set of words of the natural language because absolute synonyms meeting condition 2 are too few (or are absent) in the natural language [7] to provide a system of subsets $\{M_1, M_2 \ldots\}$ that partitions the set M of the concepts of the natural language. In the natural language a word may have a number of synonyms that are not in synonymous relations among themselves [8]; it proves that the subset of synonyms $\{M_1, M_2, \ldots\}$ does not form a partition of the set M. The same reasons made the quasi-synonymy relations of equivalence classes still more distant from the synonymy relations of the natural language.

In different thesauri, descriptors are constructed according to different rules. For instance, in the thesaurus [9] terms are united in classes of conditional (by sense) equivalence if one of the three conditions are satisfied:

- equivalence, when the concept volumes coincide;
- overlapping, when part of one concept volume is included in another concept volume;
- subordination, when one concept volume is a part of another concept volume.

In the thesaurus [10] conditional equivalence is defined as follows: if some word (part of a word or a combination) in any document of the file of the given IR system can be replaced by another word (part of a word or a word combination) in such a way that the supply of documents on any rational request is the same, then such words (parts of words or word combinations) are considered to be equivalent, conditional synonyms and members of one class of conditional equivalence.

One can see that conditions for the construction of descriptors in these thesauri are different as in the case of overlapping or subordination of relations between lexical units it is not always possible to replace one word (part of a word, a word combination) in a document by another word (part of a word, a word combination).

As we shall see in the second case, the conditional equivalence is too close. In the first case, the conditional equivalence is not an equivalence relation, and if it is understood literally, impels one to correlate words which are very remote in meaning.

In some thesauri the requirements for equivalence are not stalled at all: thus, in [11], classes of conditional equivalence are formed of terms that have any degree of synonymous or quasi-synonymous relations.

So, the construction of descriptors in thesauri differ in criteria which determine synonymous and quasi-synonymous relations. These relations are described by means permitting partitioning of the concept set of the thesaurus. And descriptors are constructed as classes of equivalence. This leads to a contradiction between:

(1) the form of a descriptor, i.e. the class of equivalence (elements which form the class of equivalence should be in equivalence relation which is characterized by reflective, symmetrical and transitive properties), and

(2) the content of a descriptor, i.e. synonyms and quasi-synonyms (the relation between synonyms and quasi-synonyms is not always reflective, symmetrical and transitive).

The notion "conditional equivalence" somehow makes clear the reason of inexact description of the "inaccurate" structure of semantic field by partitioning, but it does not take the descriptor model nearer to the structure of the natural language. Besides, this notion has no mathematical interpretation, and this results in ambiguities.

The structure of semantic fields is described more precisely with the help of tolerance classes than with equivalence ones. The tolerance relation is not characterized by transitive property and, therefore, it enables to construct a system of classes without rigid partitioning into mutually exclusive classes which is inherent in the "inaccurate" structure of semantic fields. In order to present the structure of semantic fields in the form of tolerance classes, we shall use the mathematical notions of [12] where binary relations are described.

Consider the set $\mathcal{M}$ of terms $\{x_1, x_2, \dots x_n\}$ chosen for the construction of the thesaurus and the set N of concept features. Then we get the correspondence

$$f_1 : M \longrightarrow N$$

where every term of M is correlated with all the corresponding features it denotes. We shall obtain the set L of concepts $\{y_1, y_2, \dots y_n\}$ for the concept is a set of features of some object or notion. Then with the help of the correspondence f_2 :M→N we shall match every term of $\mathcal{M}$ and its descriptive feature which it denotes, i.e. determine dominant features of concepts. We shall get the set H of dominant features $\{Z_1, Z_2, \dots, Z_n\}$. The tolerance relation on the set L is given by the correspondence

$$f : H \longrightarrow L$$

that correlates every dominant feature of the set H with subset D of the set L in such a way that its elements possess descriptive features that correspond to the respective dominant features.

The set L is a tolerance space $\langle L, A\rangle$ as the tolerance relation A_f is defined by it. Now we describe the elements of the space $\langle L, A_f\rangle$. The set $P \subseteq L$ is a tolerance quasi-class in $\langle L, A_f\rangle$ if any two of its elements Y_ζ and y_δ are tolerant, i.e. $y_\zeta A_f y_\delta$ holds. The set $K \subseteq L$ is a tolerance class in $\langle L, A_f\rangle$ if K is the maximal quasi-class.

The process of descriptor construction as a tolerance class K lies in grouping of synonymous and quasi-synonymous concepts $y_1, y_2, \dots, y_n$ between which there exist the tolerance relation A_f. The relation A for the set K is tolerance (for tolerance relation) if it is reflective and symmetrical [12]

If we suppose that there are absolute synonyms in the natural language, then for such absolutely synonymous concepts the tolerance relation is transitive and turns out to be the equivalence classes. The tolerance relation becomes an equivalence relation if it is not only reflective and symmetrical but **transitive** as well.

So, descriptors depending on the semantics of the corresponding lexical units can be tolerance classes and equivalence classes (as a particular case of tolerance classes).

We shall construct the IRL vocabulary of the thesaurus S by choosing the base H_β of tolerance classes [12]. These are "necessary" and "superfluous" classes in the tolerance space $\langle L, A_f\rangle$. Therefore, the construction of classes for the set L can be achieved in such a way as to obtain the base H. For every dominant feature Z of the set H for the set of concepts L we shall construct tolerances classes K.

The set of classes $\{K_1, K_2, \dots, K_p\}$ in the tolerance space $\langle L, A_f\rangle$ forms the base H_β because two following conditions are met:

1. As the set N is not limited by a number of features for any tolerance pair y_ζ and y_δ there exists a class $K_\zeta \in H_\beta$ such, that $y_\zeta \in K_\zeta$ and $y_\delta \in K_\zeta$ – ; thus, the first condition for obtaining the base is met.

2. Because the correspondence coordinates $f : H \rightarrow L$ every dominant feature only with one set of elements, i.e. only "necessary" classes are constructed, exclusion of at least one class leads to the loss of this property; thus, the second condition for the base H_β is met.

It follows from the definition of the base H_β that tolerance in $\langle L, A_f\rangle$ is given by p features, corresponding to p base classes $K_1, K_2, \dots, K_p$. And one need to determine which superfluous classes the given element belongs to. Thus, the vocabulary S is characterized by the system of set $\{K_1, K_2, \ldots, K_p\}$ that forms the base H for the set L of the concepts $\{y_1, y_2, \ldots, y_n\}$, chosen for the construction of the thesaurus vocabulary.

The construction of descriptors and thesaurus vocabulary with the help of this mathematical routine enables us to increase the semantic power of the thesaurus as it reflects more precisely the semantic fields of the natural language.

Now we shall give examples of tolerance classes chosen for the set of words of the natural language.

To have novelty	Reconstruction	Author's asset
Author's certificate	improvement	patent
improvement	modernization	author's certificate
modernization		
new...		
novelty		
patent		
is patented...		
is proposed...		
is developed...		
developed		

Choosing other dominant features may change the composition of tolerance classes.

On the basis of the above described model a number of practical methods of descriptor construction has been developed.

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THE EXPLOSION OF SCIENTIFIC KNOWLEDGE AND THE JOURNAL EDITOR

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and Industrial Research, New Delhi-1

The role of the scientific journal editor in effective communication of ideas and results of research in the present-day context is discussed. It is believed the journal editor can contribute much in the alleviation of the situation.

Reporting of results of research has been an accepted part of scientific method for over three hundred years. A highly interesting system of control of publications has grown up operating through institutes and societies, involving strict refereeing, with remarkable care and efficiency.

A report of research normally serves as a foundation for further work or as an extension of the scope for completeness of a theory or concept. It sometimes furnishes the basis of a plan or procedure. A paper on a scientific or technical subject necessarily consists of a) report of facts, b) an interpretation of facts, and c) a combination of a report and an interpretation.

The incalculable gift of the laboratory is its discipline in scientific method and its training in the importance of logical reasoning and the use of exact language in speaking and in writing i.e. accuracy in measurement and precision in statement.

The main vehicles for the publication of research reports and for the transmission of new information are the science journals, abstract journals, patents and verbal communications either by personal contact or through symposia and conferences. Of these the journals are perhaps the most important, for information passed by word of mouth is usually fragmentary and abstracts are necessarily abbreviated, variable in quality and as a rule late in appearance.

The role of a journal should not only be to ~~pro~~ provide a forum for the publication of the most significant original articles but also to clearify issues. In this context the act of communication acquires enormous significance and must stimulate as well as inform and the immediecy of the implications of what is communicated is bound to play an important part. Communication ultimately is the key to man's self-awareness and implies more than one-way dissemination of information. It gains its full significance only when a multiplicity of points of view, of interests, of aspirations what themselves ag ainst each other through critical confrontation.

It should also be realized that publication is not a duty consequent on time and money spent; it is not a right consequent on a more desire to speak; it is a privilege consequent on there being some person who really wants to listen.

Some of our readers doubtless question why certain papers have ever been selected for publication. The decisions of each Editor to a large extent eventually determine and establish the character of a journal. What are the significant factors that determine whether Manuscripts are accepted, rejected t or subjected to modification? With such rapid advances in science it is not possible for any individual to be knowledgeable about more than a small portion of the material submitted to him for publication. Practical assistance is required in the management of the great flood of scientific literature that arrives by each post. There is always an imminent need to work off a backlog of manuscripts.

Editorial rejection is a powerful force in the arrest of this tremendous flood and flow of literature and there is also a tendency towards more stringent publication. Selecting of most of the manuscripts which eventually appear, depends crucially on the usually unstinted help of a small army of referees. Referees vary widely in ability to make critical judgements and maintain their objectivity. It is not also unusual to receive entirely opposite opinions on the same paper. But then can a single referee be ever fair? This question is unanswerable. Sometimes a referee may be able to point out why a whole manuscript is vitated by some fundamental error, but this is very rare.

The standard letter to the referee contains a frank invitation to subjectivity and his views are ascertained with regard mainly to the originality and scientifically sound content of the contribution and of its immediate interest to the scientific community. The criticism of a referee after strikes at the root of an argument: 1) SIMILAR BUT NOT identical piece published elsewhere. 2) Techniques are less appropriate. 3) Work is premature. 4) Too specialized. 5) Rapid publication does not seem essential.

These views are necessarily subjective, and in particular the return of a manuscript to the author cannot be interpreted as deliberate criticism. However the effect of refereeing is only to shunt and delay - for very often a paper rejected by one journal eventually appears elsewhere.

All this is tantamount to an open declaration that there is no such thing as a single-valued entity called scientific merit, which will decide which manuscripts are published and which are turned away. Those who find themselves caught up in the problem and process of selection are well aware that in the long run the reputation of a journal rests on the fact that this job should be done intelligently, meticulously and sympathetically, i.e. a balance has to be struck between the interests of the readers and those of the contributors and in case of conflict, the interests of the readers being paramount, will determine policy.

The editor has frequently to decide whether an author should be given an opportunity to make extensive revisions. If the manuscript contains previously unreported information, such revision may be justified. This frequently becomes a time-consuming task for an editor, because if the author is unable to prepare an acceptable paper, he probably cannot make adequate revision without competent assistance. Most authors are appreciative of the opportunity to modify a manuscript ; while a few resent even constructive criticism and on occasion to inform the editor. In reality it is a back-breaking job to compare referees' remarks with the original manuscript and modify suitably.

This brings us to the question of the length of an article and one may reiterate the journalistic principle, that something worth saying must almost by definition be worth saying briefly. Editors are also normally aware of the shortcomings of authorship and one of these is the 'verbal-arithmetic muddle' which is turn, is confusion contigent on erroneous arithmetic and inexact wording, both originating in cloudy thinking.

The chances for error in communication are enormous. Lack of clarity in composition and hasty, perfunctory bibliographic work leads to perpetuation of error. Normally there is a tendency to pad one's list with irrelevant references, often to impress the reader. The worst mistake is to copy content and references from another paper, without consulting the original, resulting in perpetuation of error, misquotation and above all incorrect references.

In this regard Clifford Dobell's account is a classic by itself. An article 'O' Uplavici was published in the Journal of the Czech Physicians in 1887. It was published as a brief abstract in German as Uplavici, O. mistaking it as an author's name, O' Uplavici in Czech actually means "on dysentery". For decades authors went on merrily quoting O. Uplavici as an author's name, till it was discovered in 1945 that 'Hlava' was the author.

Authors should find easily understood ways of saying what they wish to say. The unwarranted and unnecessary use of polysyllables in place of the more usual monosyllables, and the use of two or more words where one would do, without any gain in precision, is the kind of writing that attracts editorial attention. An author very often retorts that he is not trying to write deathless prose but only trying to impart scientific knowledge. As Goethe once remarked editors and readers have no time to struggle with author's confused thinking, having enough of their own.

The hard-core scientist who writes down his findings in his own and his colleagues' laboratory slang, what is journalistically known as "in-writing", may rest assured that his idea will not be misunderstood by his co-workers, but to all readers outside his closed shop his manuscript would be meaningless. In order therefore to reach a wider audience he may ensure that what is written is lucid and comprehensible. It may come as a rude shock to the poor researcher that the reader has very often to be wooed into reading what he writes.

The editor's responsibility does not end with merely selecting and preparing for publication the work of an author i.e. it does not end with the mechanical editing of any manuscript, what is in a lighter vein generally known as dotting the i's and dashing the t's. Close reading is no doubt important to ensure consistency of capitalization, spelling, hyphenation, punctuation and grammar and many other details of style. Watching for lapses, checking on footnotes, bibliographies and tables form an important part of the routine work of an editor. What is more important is the substantive editing, involving rewriting reorganizing or suggesting other ways of presentation.

George Minot has said that medical journals should further knowledge and aid in disseminating it through the civilized world and in sifting the important pieces of work from the less significant on the basis of the presumably sound judgment of the editors. In this respect no journal can be stronger than its editorial board and its reviewers.

A major trend in the organization of science during the past two decades has been an evolution away from the individual investigator in favour of research teams, often resulting in multiple authorship, which in turn necessitates an extravagant expenditure of valuable time and effort, in the indexing and bibliographic services, which might otherwise have been devoted to more constructive endeavours.

Besides, instead of being a means of giving credit for creative endeavours it is evident that there is a tendency to degrade authorship into a form of menial patronage. A reversal of the present trends will require the stringent elimination of the practice of carelessly offering co-authorship to one's colleagues as a token for small services rendered in the conduct of research. This trend towards multiple authorship is generally being deplored, and must be restricted to the minimum, for all the authors could not have possibly contributed to the creative thinking of the article.

The contribution of creative thinking to the advancement of science is the prime requisite for authorship of a scientific paper and creative thinking assumes its greatest importance in the design of an experiment as also in the analysis of experimental results.

Authors would do well to follow the instructions contained in the Unesco "Guide for the preparation of Scientific papers for publication" drawn up with the conviction that the observance of these rules will speed up the classification of scientific documentation, enhance the value of the information contained therein and reduce the enormous expenditure incurred by the scientific and technical documentation centres of all countries.

The Royal Society Conference of Editors in 1968 decided that the Society's own journals should require the use of SI Units, which is an extension and refinement of the traditional metric system.

It embodies features which make it logically superior to any other system, as well as practically more convenient, as it is rational, coherent and comprehensive. The metre and the Kg. replace the cm. and the gramme of the old metric system. Multiples of units are normally to be restricted to steps of a thousand and similarly fractions to the steps of a thousandth, finding their place in the units of force, electro-statics, electromagnetics etc. We may also benefit by adopting the international units.

Today in India transmission of new scientific information is the exclusive province of the science journals and words and illustrations are frozen on the printed page. The Directory of Indian Science Periodicals lists around 1000 current periodicals, published in English. Of these only around 350 are being abstracted indicating how woefully inadequate is our abstracting machinery. It has been estimated that Indian science authors constitute only about 2.3% of the world's total. Be that as it may the journal position in India is very unsatisfactory and with the mounting backlog, editors are constantly battling to keep the publications down.

The tendency to assess the ability of a scientist by the volume and weight of printed pages issued by him has encouraged a vast and not always necessary amount of publication. Lord Todd and several other senior scientists have deplored this 'rat-race' among scientists resulting in the attitude of 'publish or perish'.

Theodore Cockerell, a specialist in Bee entomology holds a world record of 3904 papers in about 67 years, at the rate of two papers a week at the height of his career. It is said that he had a perpetual fear of imminent death and moreover he believed in publication as a means of communication and not as a means of pronouncement.

In the result we now face the grave problem of coping with the 'scientific information-crisis' caused by the literature explosion and several suggestions to grapple with this have been made by eminent scientists in charge of the information policy, of their countries.

It has been suggested that a single multiple language international super journal be established such that publication in it would become a mark of great distinction, perhaps more frequent than the Nobel Prize but rarer than membership of a merely national professional society, thus evolving an international powerful monitoring service.

This brings to mind the birth in 1937 of the most famous French mathematician Nicolas Bourbaki-being the name of a team of twelve top scientists who meet twice or thrice a year. All papers are submitted to each member and published in the common name of N. Bourbaki. This kind of joint venture will result in a decrease in the number of publications and may well lead to a system where papers can be published in the name of a laboratory.

The amount of new scientific information alone which is published worldwise each day would fill eight 24-volume sets of the Encyclopaedia Britannica. In such a world where this information is expected to double every few years, in a world where scientific theories have a life span of less than four years, in a world where education is literally the key to national progress, winds of change are blowing.

With electronic assistance, material from ten journals located all over the world can be flashed on to a screen at the same time for instant reference. Conventions and symposia can now have global audience, thereby reaching life-saving knowledge in the Biomedical sciences to those who need it. The scope of communication for health as for other disciplines, is in fact almost unlimited. A whole range of technology from satellites to microfilms is waiting for us to put it to work. The rules of the game are the same whether the physician is talking to a patient, a teacher to a student or a computer to a computer.

Ultimately the goal is for the establishment of an orderly method for acquiring, assimilating and disseminating the knowledge that turns the giant turbines of human imagination - for whatever the mind of man can envision the genius of modern science can turn into a fact.

While we in India are as yet untouched by the on-going cybernetic revolution, the day may not be far when we shall adopt the same devices for centralization of storage and decentralization of access and use. Unless major attention is directed to the improvement of our national Medical/Science Library base, the data bank, the continued and accelerated generation of scientific knowledge will become increasingly an exercise in futility.

As Arnold Toynbee has said, our age will be remembered because it is the first time since the dawn of history, in which mankind dared to believe it practical to make the benefits of civilization available to the whole human race, and this calls for a very efficient network of communications.

Health is as necessary and as much a human right as food and shelter and unless the consumer of health services knows when to seek help, where to seek it and how to follow a prescribed course of action, all the marvels of modern medicine will pass him by.

The American Association for the Advancement of Science and the BAAS recently discussed their future responsibility with regard to the sheer volume and explosion of scientific information, ever-increasing specialization of the modern scientist, the rapid rate of educational obsolescence and the disproportion between the promises of the scientists and their realisations. The inefficient mode of communication between academic and applied science and lack of our ability to index more than one fifth of the published literature caused grave concern among the scientists.

It was emphasized that the scientific revolution of the twentieth century must be accompanied by technological improvement in information science which will make knowledge generated by research readily and rapidly available to all who need to apply it for the ultimate benefit of mankind. The on-going cybernetic revolution affects language, information and society broadly. As a strong nation requires a healthy scientific base, so does a strong science require excellent communication system to convert research science into practice.

The National Library of Medicine in the United States of America has established a new centre for Biomedical Communication and the Computer-based MEDLARS, Medical Literature Analysis and Retrieval System, as a national biomedical network has played a very important role in rapid and economic dissemination of information. U.K. has also followed suit and has established a similar network.

We in India may look forward to such facilities in the near future if a national information policy is formulated keeping these worthy goals in mind and be warned that science itself may die, if scientific communication is wounded.

In conclusion I wish to express one pious hope that the increasing obsession and pressure to publish will never overbalance that innate trait of superior authors to maintain the highest equality in the preparation of their manuscripts, keeping in view the maximum that a good paper is twice as good at half its length.

INTERGOVERNMENTAL CONFERENCE ON THE PLANNING OF NATIONAL DOCUMENTATION, LIBRARY AND ARCHIVES INFRASTRUCTURES,

Paris, 23-27 September, 1974

Mr. S. Parthasarathy, Scientist-in-Charge, Indian National Scientific Documentation Centre, attended the Intergovernmental Conference as a member of the Indian Delegation. We are reproducing below excerpts from Mr Parthasarathy's report on the Conference – Ed.

The Intergovernmental Conference was organised by Unesco in cooperation with the International Federation for Documentation, the International Federation of Library Association and the International Council on Archives. Some 320 librarians, documentalists and archivists representing 85 countries participated in this Conference.

PLENARY SESSION I

The Conference was formally opened on the 23rd by Mr. René Maheu, the Director General of Unesco. In his speech he highlighted the importance of developing suitable national infrastructures as a basis for the planning of economic, social and cultural development in the country. He stressed that the discussions should not only deal with the development of those national systems but also consider ways for coordinating various national practices so as to facilitate exchange of information between various countries . This should also lead to national participation in international cooperation programmes such as UNISIST. The application of modern information technology for providing better service should also be considered. He pointed out that the scope of this Conference would be complementary to the UNISIST programme which was mainly designated to establish a World System for the Communication of Scientific and Technical Information. He suggested that the Conference should address recommendations to (1) the States regarding formulations of information policies, developing of National Information Systems and collaboration with international system; and (2) Unesco and other international organisations for improving the national services. The recommendations from this Conference would be submitted to the Unesco General Conference to be held in October this year.

Prof. H. Arntz, President of the International Federation for Documentation, Dr. Herman Liebaers, President of the IFLA and Mr. R.G. Dubosq, Vice-President, ICA spoke on the role of their respective organisations, especially in relation to the organisation of the present Conference. Mr. A.S.M. El Shoniti, Chairman, General Organization for the Book, Ministry of Culture and Information, Cairo, Egypt was elected as President for the Intergovernmental Conference. After adopting the rules of procedure, the following Vice-Presidents and Rapporteur General were elected:

Vice-Presidents

1. Mr. G.M. Akita (Ghana)
2. Mr. Guillormo de la Garza (Mexico)
3. Mrs. L.A. Gvishiani (USSR)
4. Mr. S. Parthasarathy (India)
5. Mr. Jean Thomas (France)

Rappo rtour Geneţal

1. Mr. John C. Lorenz (USA)

After adopting the agenda, a timetable was drawr drawn up for discussing the Working Document.

A Steering Committee was formed consisting of the President, the five Vice-Presidents and the Rapporteur General. The Presidents of FID, IFLA and ICA were invited to participate in the discussions of the Steering Committee. Later on the Chairmen of the Working Groups and their rapporteurs also attended the Steering Committee meetings.

PLENARY SESSION II

During the Second Plenary Session, a general discussion was held on the scope and objectives of the National Information Systems (NATIS).

A number of countries welcomed the action of Unesco for convening an Intergovernmental Conference on this important subject at this time. The need for developing national infrastructure for evolving an integrated information system was realized by many countries. The countries which took part during this discussion were: Nigeria, Hungary, France, USSR, Ivory Coast, Congo, Denmark, Iran, Mexico, Canada, Senegal, Lebanon, United Kingdom, Yugoslavia, Malaysia, USA, India and GDR.

The following three Working Groups were formed for examining the concepts of NATIS and the objectives for national and international action.

1. Integrated planning of national documentation, library and archives infrastructures.
2. Planning the application of technology to documentation, library and archives services.
3. Planning manpower for documentation, library and archives services.

Working Group I

The Working Group I elected Mrs. K. L. Laubhouet of Ivory Coast as Chairman, Dr. Guy Sylvestre of Canada as Vice-Chairman and Mr. Morris Reiger of USA as Rapporteur.

The Working Group I discussed in great length the meaning of the term 'Information', especially in the context of the use of this term by information ministries in some of the developing countries. It was pointed out that the use of the acronym NATIS and its scope should be sufficient for clarifying the meaning of the term 'Information', It was also pointed out that the national, political, economic, social and cultural variations would necessarily result in different models of NATIS in different countries and this variety would also reflect the differing national goals of each country, which must be served by its NATIS. In view of the sky-rocketting price of publications it was suggested that Unesco should consider the possibility for establishing a fund to ameliorate the effects of inflated prices. The desirability of giving greater emphasis to the planning of information systems and structures at the regional level was also stressed. There was overwhelming support for establishing universal bibliographical control and Unesco was urged to undertake a study of technical, financial and other means by which the UBC programmes could be assisted.

The Working Group I submitted recommendations on the following subjects:

1. Promotion of Research on the planning and development of DBA infrastructures.
2. Establishment of Unesco general guidelines for the implementation of NATIS.
3. Promotion of national coordinating organs for planning and implementing NATIS in general accord with the Unesco guidelines.
4. "State of the art" reviews of national planning of DBA and information services and infrastructures;
5. Unesco projects for the evaluation of integrated DBA planning and development efforts;
6. Future consultations and conferences for the evaluation of DBA, UBC and UNISIST programmes;
7. Bilateral assistance for the planning and development of DBA infrastructures;
8. Training activities in aid of the planning and development of DBA infrastructures;
9. Promotion of international and national standardization in the information field;
10. Co-ordination and harmonization of external assistance in the DBA fields;
11. Support of Unesco-sponsored regional working conferences for specialists in such areas as DBA infrastructural planning, training, emergent regional problems;
12. Study of financial, technical and other means for intergovernmental assistance to UBC;
13. Recommendations of an expert study group to formulate proposals for the development of a unified co-ordinated overall Unesco programme in the fields of information, documentation, libraries and archives.

Working Group II

Dr. Bjorn Tell of the University of Lund, Sweden, was elected as the Chairman of Working Group II. Mr. D.E.K. Wijasuriya of Malaysia was elected as Vice-Chairman. Miss A. Scufflaire of Belgium was elected as rapporteur.

The Working Group considered the need for the application of information technology. The objectives given in the NATIS (3) document on the planning of technological needs for NATIS (objective 9) and the role of Unesco for supporting the application of information technology in the various countries (objective 13, ii) were discussed in detail.

The Working Group emphasised the need for taking an inventory of their resources by each country as a first step for developing a national information system. Unesco should develop a suitable model for the establishment of a National Information System which should include also an inventory of the national resources. The need for standardization was stressed and the work of ISO in this connection was mentioned. Unesco should support all initiatives taken by the national and international non-governmental organisations, which contribute to the formulations of standards by ISO. The Group also stressed the need of Unesco support for the application of modern methods of information technology in the developing countries.

The Working Group II submitted recommendations on the following subjects:

1. Avoidance of indiscriminate application of information technology in developing countries;
2. Study for evaluating costs involved in applying technology and the services to be rendered, using appropriate indicators;
3. Study relating to availability of software packages with Unesco support;
4. Application of standard criteria and jointly-agreed planning methods for facilitating exchange of experience at all levels;
5. Need for special legislation for facilitating use of modern technology;
6. Support of Unesco in its Medium Term Plan for the application of many media (microfiche, magnetic tapes etc.);
7. Preparation of inventory of resources and a model for a national information system with the support of Unesco.

Working Group III

The Working Group III elected Mr. Preben Kirkegaard of Denmark as Chairman, Dr. Ivan Borsa of Hungary as Vice-Chairman and Prof. F. A. Ogunsheye of Nigeria as rapporteur.

The Working Group discussed various topics such as trends in information manpower, structure of the profession, education and training, relation between education and training and continuing professional education. It was pointed out that the Governments should give recognition to the professions of information scientists, librarians and archivists. The training of teachers, especially for new schools in developing countries, was also stressed. Unesco was urged to give more assistance to such training schemes for the teachers. The need for establishing regional schools was also emphasised.

The Working Group III submitted recommendations on the following subjects:

1. Parity of service conditions of information personnel with other professions;
2. Need for a common core programme for training of librarians, documentalists and archivists.

PLENARY SESSION III

The reports of the three Working Groups were presented by their rapporteurs at the third Plenary Session.

PLENARY SESSION IV

India took the initiative for formulating a general overall resolution covering the scope and objectives of the Conference, the action to be taken by the Member States, the Unesco and other international organisations and the submission of the proposals and recommendations of this Conference to the forthcoming 19th Session of the General Conference of Unesco. The support of a number of countries for the formulation of this draft resolution was received. This was discussed during the Plenary Session, paragraph by paragraph, and approved with some modifications:

Draft Resolution

Recognising that information has become an essential basis for the progress of civilization and society and that by improving human relationships in their own societies and between peoples of different cultures and traditions it contributes to better understanding and world cooperation,

Noting that there exists in many parts of the world an imbalance in the provision of resources for making access to information possible to users in all fields of knowledge,

Considering the importance for both developing and industrialized countries of concerted action at the national. regional and international levels to ensure full use of existing information facilities,

Appreciating the action of Unesco, in co-operation with the International Federation for Documentation, the International Federation of Library Associations, and the International Council on Archives in convening the present Conference so as to generalize the findings of the regional conferences on planning in Latin America, Asia, Africa and the Arab States and to provide governments with general guidelines of planning policy and methodology for documentation, library and archives services, and also appreciating the recommendations coming from the Intergovernmental Conference on UNISIST and subsequent guidelines developed.

Accepts the general concept of national information systems (NATIS), as outlined in the document COM-74/NATIS/3, as an overall national structure encompassing all services involved in the provision of information for all sectors of the community for all categories of users;

Invites Member States of Unesco to take suitable action to create or improve a national information system or an infrastructure for information services, in accordance with the economic and social structure of the country and its cultural heritage and within the framework of the national overall and sectoral development plans and its communication policy;

Recommends that such a national system or infrastructure should be supported by the prerequisites of appropriate legislation, financing, qualified manpower, and use of modern information technology and provided with appropriate national co-ordination of the various components of the system;

Recommends that to help Member States achieve their national information systems, Unesco should increase its assistance especially to developing countries;

Recommends that the Director General of Unesco, in consultation with Member States, establishes under the aegis of Unesco appropriate machinery to ensure that Unesco activities are directed towards assisting the close articulation of national, and international activities;

Recommends that the close co-operation between Unesco and the three international non-governmental organisations associated with the Conference continue and intensify and that this co-operation be extended to other relevant international non-governmental organizations such as the International Crganization for Standardization, International Council on Reprography, etc., and including those representing users, concerned with substantive fields generating information to be communicated;

Recommends to the Director General of Unesco that the proposals made in this and the following more detailed resolutions be submitted to the eighteenth session of the General Conference as a basis for the formulation of a long-term programme for documentation, libraries and archives to be submitted at the nineteenth session of the General Conference;

Expresses the wish that the General Conference should take necessary measures to ensure the most effective implementation for the NATIS within the 1975-76 programme and budget of Unesco.

PLENARY SESSION V

Participants agreed on several recommendations concerning the establishment of National Information System to meet the economic social and cultural requirements as well as ways to include and coordinate these services to meet fully the needs of those who use them. Unesco's role and the aid that the Organisations can offer particularly to the developing countries, was also stressed.

During the last session the recommendations emanating from the three Working Groups were discussed in great detail and a report presented orally by the Rapporteur General was accepted for presentation to the forthcoming General Conference of Unesco. List of objectives for national and international action for National Information Systems presented in the NATIS document (3) for discussion during the Intergovernmental Conference

1. OBJECTIVES FOR NATIONAL ACTION

1.1 Requirements of NATIS

Objective 1 - A national information policy

A national information policy, reflecting the needs of all sectors of the community, and of the national community as a whole, should be formulated to guide the establishment of a national information plan, whose elements should be fully incorporated in the national development plans.

Objective 2 - Stimulation of user awareness

In order to increase user awareness, appropriate bodies, including universities and other educational institutions should include in their programmes systematic instruction in the use of the information resources available in all the elements of NATIS

Objective 3 - Promotion of the reading habit

In order to foster and maintain the reading habit the network of school and public libraries within NATIS, in co-operation with the appropriate educational institutions, should develop programmes specially designed to attract and sustain the interest of a wide potential clientele.

Objective 4 - Assessment of users' needs

A detailed analysis should be made of the information needs of government for its tasks and of the various groups of users in such areas as industry, research and education to ensure that the national information system (NATIS) is planned to meet these needs.

Objective 5 - Analysis of existing information resources

Comprehensive surveys should be undertaken of existing national documentation, library and archives resources as an essential prerequisite of sound national planning for the development of NATIS.

Objective 6 - Analysis of manpower resources

Comprehensive surveys should be undertaken of existing national manpower resources as a basis for the planning of manpower provision and the forecasting of future needs for NATIS.

1.2 PLANNING NATIS

Objective 7 - Planning the organizational structure of NATIS

The functions of all documentation, library and archives services should be co-ordinated throu through a central body (or bodies) to form the national information system (NATIS), so as to ensure the optimum use of available resources and themaximum contribution to the cultural, social and economic development of each nation.

Objective 8 - Supplying manpower for NATIS

National institutions and programmes of professional education for information manpower should be established as integral parts of the national educational structure at universities or equivalent institutions of higher education, and as the principal means of supplying adequate numbers of professional staff to meet the demand for qualified personnel to operate the national information system (NATIS).

Objective 9 - Planning the technological needs for NATIS

The national information plan should include adequate provision for the application of information technology, as apprpriate, in the various components of NATIS with the aim of ach achieving maximum utilization of existing resources and of reaching compatibility and standardization.

Objective 10 - Establishing a legislative framework for NATIS

Legislative action would be taken at the earliest possible stage in support of the planning and implementation of the national information system (NATIS). This legislation should cover tl the conceptual basis of the system, and of its constituent elements including all specialized sub-systems.

Objective 11 - Financing NATIS

Adequate financial provision should be made to ensure the effective implementation of the plan for the national information system (NATIS).

1.3 Universal bibliographic control in relation to NATIS

Objective 12 - Universal Bibliographic Control

The concept of Universal Bibliographic Control (UBC) presupposes the establishment in each country of National Bibliographic Control with its aim to ensure that a bibliographic record for each new publication is made when the publication is issued.

2. OBJECTIVES FOR INTERNATIONAL ACTION

Objective 13 - Assistance to Member States for the planning and development of NATIS

The planning and development of a national information system (NATIS) and its elements in Member States will be promoted to achieve co-ordination at national level and as a basis for active participation in world information systems

(i) Methodologies will be elaborated as basis tools to guide Member States in the various phases of planning and developing NATIS

(ii) The application of information technology to documentation, library and archives services will be encouraged and promoted in accordance with the NATIS concept.

(iii) The programme for professional education and training of information manpower will be revised and extended in the light of the needs of Member States in developing and implementing NATIS.

Objective 14 - Promotion of Universal Bibliographic Control

Universal Bibliographic Control will be promoted by Unesco, in co-operation with IFLA, as a major policy objective to create a world-wide system for the control and exchange of information.

Objective 15 - A long-term programme of action

A long-term programme of action for Unesco will be elaborated to assist Member States in the planning and establishment of coherent national information systems (NATIS), which can participate as full partners in the transfer of the rapidly growing volume and sources of documentation and information.

Objective 16 - Convening of an intergovernmental conference

An intergovernmental conference will be convened in 1978 to review the progress achieved within the framework of NATIS, UNISIST and UBC programmes.

List of Conference Documents

[1] National Information Systems (NATIS): Objectives for national and international action. (COM.74/NATIS/3)

[2] Working Document. (COM. 74/NATIS/4).

[3] Regional Meetings of Experts on the National Planning of Documentation and Library Services: Summary of the main recommendations. (COM. 74/NATIS/Ref. 1)

[4] Planning of National Overall Documentation, Library and Archives Infrastructures by H. Arntz. (COM. 74/NATIS/Ref. 2).

[5] Universal Bibliographic Control by D. Anderson (COM. 74/NATIS/Ref. 3).

[6] Planning for Information Technology by J. Becker and L. Burchinal. (COM. 74/NATIS/Ref. 4).

[7] Planning Information Manpower by P. Havard-Williams and E. G. Franz. (COM. 74/NATIS/Ref. 5).

FOCUS ON UNISIST PROGRAMMES

In the fourth instalment of this Feature, we are first presenting the remaining part of the report of the First Session of the UNISIST Steering Committee. After that a report of the First Session of the Advisory Committee is presented from the UNISIST Newsletter vol.2 no.2 - Ed.

FIRST SESSION OF THE UNISIST STEERING COMMITTEE, PARIS, 5-9, NOVEMBER, 1973
[Continued from the previous issue]

6. Harmonization of international assistance programmes in training and education. The need for harmonization of international assistance programmes in training and education had been stressed in May 1972 by the UNISIST Working Group on Information Requirements of Developing Countries which recommended that "Unesco should, within the framework of the UNISIST programme, undertake to promote the co-ordination of the international efforts in the field of technical assistance for scientific and technical information and documentation in developing countries. Furthermore, UNISIST should provide the forum through which the organizations concerned can identify, harmonize and co-ordinate national and international assistance programmes in developing countries".

A draft plan for the co-ordination was prepared as a Unesco contract. It contains five elements: (a) the recognition of an international focal point as forum for co-ordination; (b) the setting-up of an international clearing house or network of organisms with a clearing function collecting and dis-seminating up-to-date, evaluated information on who is doing what, when and how in the field of training and education in documentation and information; (c) periodical meetings of bodies involved in international assistance programmes; (d) a liaison bulletin for interested parties giving fast diffusion of information on current projects in this field; and (e) an advisory function on policy.

Many delegates, especially those from developing countries, underlined the fundamental importance of such a project. During the discussion, it was pointed out that funds should be allocated where they were most needed and that the "inventory" function should be supplemented by the stimulation and co-ordination of institutional effort.

7. UNDP-Financed Projects within the UNISIST Programme. Six operational projects were presented to the Committee: four national ones in Colombia, Indonesia, Korea and the Ivory Coast, and two regional ones in Latin America and South East Asia.

These projects present many advantages:

First of all, they provide an opportunity to implement UNISIST principles in developing countries. Furthermore, they offer an effective means of giving international assistance in scientific and technological information and documentation in a unified and co-ordinated fashion with a common basic philosophy adapted to local needs and also present an opportunity to introduce the necessary compatible elements in newly-created information systems, thus gradually building the loosely-connected network of the future that UNISIST aims for.

These projects also provide a direct link with the real problems in the field, the difficulties to be surmounted and the information needs of Member States. They could have a dual effect - giving practical assistance to Member States and securing an indispensable feedback of information to UNISIST as an international programme.

The comments of delegates revealed a marked sympathy with the aims of these projects and the Committee expressed its firm conviction that UNDP-financed projects formed an indispensable part of the UNISIST activities as a whole, complementing in a constructive fashion the wide range of projects under the Regular Budget.

8. Training courses and education activities. In the introduction to the subject it was pointed out that, because funds were meagre in relation to needs, Unesco had selected activities

which would generate further activities and therefore additional benefits. Particular emphasis had been placed on the training of teachers, managers and users of information, especially in developing countries, whose specialists had been involved together with those from developed countries with experience of teaching in developing countries. Attention had been paid to the need for first efforts in the English language to be further developed in other languages. Finally, Unesco has constantly submitted individual projects for discussion at international meetings.

The projects already launched are: a Handbook for Scientific and Technical Information and Documentation Services; a Manual for the Education and Training of Users of Scientific and Technical Information; an international training course for teachers in information-retrieval systems at Katowice, Poland, in August 1974 and the adaptation of a course for managers of information systems at Maryland University, United States of America, for developing countries. Subsequent negotiations have led to proposals for regional courses in Japan (Summer 1974) and Tunisia, and other courses in France and the United Kingdom.

The Committee approved the above-mentioned UNISIST activities in the field of education and training. The creation of a UNISIST Ad Hoc Committee on Education and Training Policy and Programme, with terms of reference and composition to be decided upon later, was proposed.

II. EXAMINATION OF THE PROPOSED OUTLINES FOR THE UNISIST MEDIUM-TERM PROGRAMME FOR 1975-1980

The Secretary of the Committee presented the outline for the UNISIST programme for the years 1975-1980...

During the six-year period 1975-1980, efforts will be concentrated on the follow-up of activities started in the previous biennium, 1974-75. The major problems which could require Unesco's action are: problems of a socio-political character, namely, the distribution of information as wealth and individual privacy versus public knowledge, and problems of a technical character, i.e.: how to ensure technical access to world information resources, and how to improve the imperfect flow and exchange of information.

The Secretary recalled to the Committee's attention,the goals and the five objectives of the UNISIST programme which still remain valid. The discussion which followed centred mostly on priorities to be given to projects and on the need for flexibility, especially as far as financial arrangements were concerned. On priorities, the need was stressed for having accurate information about national information services and to ascertain what could be done to help build up services and introduce new systems. It was also considered important to study work already being undertaken by regional bodies such as CMEA and EEC, and to co-ordinate their efforts thereby increasing their possible achievements. The discussion showed that it might be valuable to concentrate on a few projects initially and to evaluate their impact on information practice. It was felt necessary to explore alternative strategies, for example alternative approaches to education and training. Finally, the importance of bringing library and information personnel together in appropriate projects was emphasized.

The Committee endorsed the proposed medium-term plan with amendments suggested by its members.

III. EXAMINATION OF PROPOSALS CONCERNING MEMBER STATES' SUPPORT FOR ACTIVITIES UNDER THE PROGRAMME

A draft of a set of "Guidelines for the achievement of information policy objectives" prepared by the Secretariat was submitted for discussion. The areas of interest covered by these guidelines included: primary communications, libraries and translations; secondary services and systems; needs for, and gaps in, national information services; networking and technological facilities; infrastructural areas such as education and training, information research and development, and standardization; administrative, legal, economic and financial problems; aid to developing countries.

The need for national focal points and UNISIST National Committees has already been recognized by many countries, especially by those belonging to regional groups such as NORDDOK (Nordic countries), OECD, CMEA and the EEC.

The list of objectives outlined in the draft guidelines was long, but any one country was likely to find that several of the functions were performed already, even if there is no formal focal point. For such functions the main needs are to co-ordinate practice better and to review and improve it where appropriate. It followed that the way in which a national focal point selects its functions and policy objectives must vary from country to country. However, in most cases the functions selected would reflect three broad types of activity which a focal point could envisage: stimulation, financial support and co-ordination.

The outcome of the discussion was that these guidelines should in fact be considered as a checklist, offering Member States a means of confronting the important policy issues before them. The final version of the Information Policy Objectives will be published as UNISIST Proposals.

IV. CO-OPERATION WITH INTERNATIONAL GOVERNMENTAL AND NON-GOVERNMENTAL ORGANIZATIONS INTERESTED IN THE UNISIST PROGRAMME

According to resolution 2.131 adopted at the seventeenth General Conference of Unesco, the UNISIST programme is to be carried out in close collaboration with other organizations of the United Nations concerned as well as with competent international governmental and non-governmental organizations.

Co-operation between UNISIST and international organizations has been so far mainly concerned with providing information on the UNISIST plans and programmes and proposing co-ordination of efforts in order to avoid duplication and ensure maximum compatibility between programmes in the field of scientific and technical information.

In introducing the subject, particulars were given about the information interests of each organization concerned and the ways in which it interacted with the UNISIST programme, based on statements provided by the organizations themselves.

The Committee expressed its general satisfaction with the wide range of fruitful contacts established so far with other United Nations Agencies and international organizations.

At the closing of the session, the Steering Committee adopted the following resolutions:

Resolution 1

The UNISIST Steering Committee,

A. Having examined the UNISIST current programme and proposed out-line for the medium-term programme for 1975-1980,

Endorses the actions and projects undertaken by the Secretariat in carrying out resolution 2.131 of the General Conference, and the proposed outline for the UNISIST medium-term programme for 1975-1980, and has recorded a number of comments in its report;

Recognizes the need for the UNISIST programme to harmonize all relevant information and documentation activities of the United Nations family and to co-ordinate and attempt to integrate, as far as possible, the activities of non-governmental organizations in the same area;

Recommends to the General Conference that the priorities established by the Intergovernmental Conference of UNISIST of 1971 - namely activities related to systems interconnexion and assistance to developing countries, especially in training and education - should be maintained, while noting that many problems in information transfer and information policy including legal and economic problems, are of special importance to some Member States; and further

Recommends that Member States of Unesco should be urged to give full support to the UNISIST programme and apply, as far as possible, the recommendations and guidelines under the programme.

B. Bearing in mind the rapid development of information science and technology and the need for flexibility in the UNISIST programme in order to ensure rapid adjustment to changing needs and opportunities:

Urges the Conference to permit a reasonable degree of flexibility in the development of the UNISIST programme by allocating specific sums within the budget to groups of projects under the objectives and not to individual projects.

C. Being conscious of the need to make the most effective use of all Unesco's resources that are available for activities in the field of UNISIST, and acting in accordance with Article 4.1 of its Statutes:

Asks the Conference, with the advice of the Director-General, to concentrate in the UNISIST programme, as an inseparable part of Unesco activities in science and technology, all conceptual and operational activities related to scientific and technical information and documentation services - as defined by the UNISIST Intergovernmental Conference in 1971 and including special scientific and technical libraries - comprising projects financed from the Regular Budget, UNDP funds and other sources.

Resolution 2

1. In accordance with Article 6 of the Statutes of the UNISIST Steering Committee, the Bureau shall consist of the Chairman and three Vice-Chairmen.

2. Taking into account the tasks and responsibilities laid upon the Bureau and the need for a decision-making process that ensures smooth co-operation between the Bureau and the Steering Committee, the Committee deems it desirable:

To recommend to the Unesco General Conference that it should modify Article 6 of the Statutes so that the Bureau shall consist of the Chairman, three Vice-Chairmen and two other members of the Steering Committee elected by the Steering Committee.

The final report of this session will be published in English, French, Spanish and Russian. It will be available upon request from the Division of Scientific and Technological Information and Documentation, Unesco, Place de Fontenoy, 75700 Paris.

FIRST SESSION OF THE UNISIST ADVISORY COMMITTEE, PARIS 4-8 FEBRUARY 1974

The General Conference of Unesco, at its seventeenth session, authorized the Director-General to establish, in the framework of UNISIST, an Advisory Committee to advise him.

on the planning and execution of this long-term international programme.

Following this resolution, the Director-General appointed the 16 members of this Committee who serve as experts in a personal capacity and represent the interests of both producers and users of scientific and technical information. According to its Statutes "the Committee shall assess the changing requirements and trends of the world's communities of scientists, engineers and technologists for scientific, technical and engineering information, and shall advise the Director-General thereon as well as assist him at periodic intervals to evaluate the relevance and adequacy of programme performance in relation to these needs".

The main items of the agenda were:

I. The examination of the UNISIST current programme and projects, and

II. The examination of the proposed outlines for the UNISIST medium-term programme for 1975-1980

I. Examination of the current programme

The Committee discussed in detail the current programme presented by the Secretariat. Two ad hoc working groups were set up during the session to allow for more detailed consideration of two projects:

(1) An ad hoc working group for the Study on Problems of Accessibility and Dissemination of Data for Science and Technology was asked to study the recommendations contained in this report and to produce a consolidated list in order of priorities.

(2) A second ad hoc working group to review the composition and terms of reference of the Ad Hoc Committee on Education and Training Policy and Programme and to make recommendations which could be forwarded to the UNISIST Steering Committee which had proposed the creation of such a Committee. Both ad hoc working groups reported to the Advisory Committee during its first session and were subsequently dissolved.

The Committee provided the Secretariat with useful technical advice on the UNISIST projects and addressed detailed recommendations to the Director-General of Unesco for the further development of the programme. The discussions showed that the Committee was in general agreement with the development of the current programme.

However, some critical remarks were expressed concerning (a) the development of a Broad System of Ordering (BSO), and (b) the Study on the Role of Information Analysis Centres in a World Science Information Net-work:

(a) The discussion on the BSO revealed some conflicting views as to the scope of the BSC scheme and to the depth into which the classification should go. The general viewpoint was that the BSO scheme should confine itself to broad subject areas and should rely for detailed classification of the broad headings upon the work already in existence such as disciplinary classification schemes and macro-thesauri.

(b) Regarding the Study on the Role of Information Analysis Centres (IACs), the Committee while strongly supporting the establishment of such centres, expressed some diffidence in accepting the institutional approach to IACs chosen for this study and felt that a functional approach was more appropriate. As to dissemination of the study report, the Committee was of the opinion that it should not be widely circulated.

II. Examination of the proposed outlines for the UNISIST medium-term programme for 1975-1980.

The draft medium-term programme was presented to the Committee and advice was requested on the adequacy of the programme in reflecting the trends and needs of the information world, on the impact of the socio-political problems and on the forthcoming biennium. After a detailed examination of the five programme objectives, the Committee discussed the phasing of the various projects and attempted to indicate those projects with the maximum impact and benefit and which should therefore be treated with high priority. Of the 39 projects listed in the medium-term programme, 15 were recommended as being of high importance whilst the other 24 were considered to be of medium to low importance.

The next session of the UNISIST Advisory Committee will take place in February 1975 at Unesco Headquarters, Paris. The report of the meeting containing the results of the discussions as well as the Committee's recommendations on the execution and future planning of the UNISIST programme was submitted to the Director-General of Unesco for his approval. Meanwhile, the Director-General accepted the report, appreciating the useful criticism offered by the members and consultants of the Advisory Committee.

AN ISDS NATIONAL CENTRE - THE UNITED KINGDOM EXPERIENCE

Background to British Library

The British Library will be responsible for the establishment and maintenance of the United Kingdom National Centre. As many of you may know the

British Library is the outcome of the 1969 Dainton Committee Report in which the operations of the main national libraries in the United Kingdom: the British Museum and the National Reference Library for Science and Invention, the National Lending Library for Science and Technology, the National Central Library, were considered, along with those of the independent British National Bibliography with a view to their rationalization and co-ordination under one organization which would carry out the national library functions for the country. With the acceptance of the main recommendations of the Dainton Report, the British Library Act was passed in 1972 to give effect to the establishment of the Library by merging these organizations. Early an organizing committee was set up consisting of representatives of the constituent organizations themselves and librarians from university, special and public library areas to undertake the complex task of preparing the initial plans. The British Library has now been established and vesting day was 1 July 1973.

The British Library has inherited from its constituent parts vast resources in books and other materials and an important part of these collections is the serial holdings in both the lending and reference areas. In order to make this material readily available there is a need to co-ordinate the operations concerned with serial processing throughout the British Library, and further to relate them to the development of a serials data base at both the national and international levels. For this and other reasons the development of the Internationals Serials Data System and the associated ISSN (International Standard Serial Number) was considered early on by the Organizing Committee and it agreed, on behalf of the British Library, that the Library should be responsible for setting up and maintaining the British National Centre for ISDS.

Setting up national centres

The starting point for considering the establishment of a national centre is the Guidelines for ISDS in which the framework for the system is outlined and details of the functions of national centres given. The basic functions involve responsibility for:

The assignment of ISSN to serials published within its area;

The assignment of ISSN to serials published within its area;
Contributing this information in accordance with ISDS requirements towards the establishment and maintenance of the international file;
Promoting the use of ISSN within its territory and providing the link between publishers of serials and the ISDS network;
The dissemination of information from its national files, and responsibility for the relationships with the various users of ISDS.

National centres should ideally be able to handle the serials published in its area but in any event it is essential that they should have access to appropriate sources which can provide the necessary information, and visual proof. Considerable bibliographical verification and checking is also to be expected particularly as certain of the details required by the International Centre may not be initially available. A basic set of twentyfive elements considered necessary for the identification of serials is required for the records in the ISDS file but clearly all of these may not be present at the time the record for a serial is first notified. For this reason it has been decided that eight elements will be considered essential in the first instance, and the remainder as they become available.

The ISDS format is a subset of the MARC serials format and where it is possible to communicate records in machine readable form to the International Centre, the ISDS common interchange format must be utilized. However, it is unlikely that many centres will be in this position in the early stages and it is far more likely that information in the form of "hard-copy" will be provided. The International Centre has recognized this situation and a suitable working sheet has been designed for the use of national centres for this purpose.

As the operations of a national centre commence its activities in promoting the use of ISSN within its territory will begin to develop. The tasks of notifying publishers of ISSN assigned to their publications, explaining the system, responding to requests from a variety of users will be essential to the centre's work.

British Centre

The British Centre as mentioned will be established under the British Library and the work of assigning ISSN to new and changed titles from 1973 will be the starting point. An initial block of 5, 000 numbers has been made available by the International Centre for this purpose. In considering the operation of the Centre it has been necessary to bear in mind themany different problems that the British Library will be concerned with, not least in connexion with the development of serials bibliographic control and many decisions have yet to be made which will affect all areas of the Libra library's work. For this reason it has seemed best to aim for an interim operation which can first cope with new and changed titles, and at least begin the wo work of contributing data to the Inteernational Centre file.

[To be continued in the next issue]

SHORT COMMUNICATION

KNOWLEDGE CLASSIFICATION IS NOT BOOK CLASSIFICATION

Library classification owes a great deal to knowledge classification. Since the days of Aristotle, philosophers have tried to classify knowledge.

1 Vedic Period

Philosophers and thinkers mapped the divisions of knowledge in their own ways. The saints and Rishies were the poineers in organising knowledge. In ancient time the division of knowledge was in the form of 'Dharma, Artha, Kama, Moksha'. Dharma was related to law, religion, philosophy, sociology and ethics. Artha was known in the form of economics, applied sciences and social sciences. Kama manifested in the form of linguistics, Fine Arts, literature and so on. Moksha was sprituation and mysticism.

2 Greek Period

Aristotle divided knowledge by his own scheme. He organised knowledge as political philosophy, legal philosophy, i.e. economics, politics and law, creating philosophy, mathematical philosophy, natural Philosophy, religious philosophy i.e. arts, literature, physics and region.

3 Scholastic Period

Knowledge was mapped by the scholars. The Greek system influenced the scholars. Scholars influenced universities and they influenced the libraries in turn.

4 Baconion System

Bacon being a scholar and philosopher mapped knowledge and formed the divisions, History, Poetry, and Philosophy. He subdivided History as natural history that is science, arts, literature, and civil history. Poetry was divided as lyrics and allegries. Philosophy was divided into natural philosophy, political science, sociology and economics. It was called consensus philosophy which remained for [illegible] two hundred years.

5 Inverted [illegible]on system

Under it classification of knowledge was as Philosophy, Poetry and History. This influenced and dominated over the Decimal Classification and UDC systems. This influence was reflected upto the modern age and affected an classification systems.

6 Consensus System

The classification of knowledge was mapped and confined to the Natural sciences, Humanities and Social Sciences. Comte, Brown and other thinkers oriented their own systems to map the universe of knowledge.

Thus attempts since the Vedic period at an evolutionary system of classification of science based on some relation of development between sciences is quite evident. Sayers regarded classification as a map of evolution, as a map of thought to show what man has yet to discover, as well as what has been discovered. Sayers, amplifying Richardson's remarks that according to the law of homology real likeness among living things indicate common ancestry. Sayers prescribed that we should refer to homology for insight into the classification of knowledge.

7 What is Knowledge Classification

The impact between knower, that is man, and knowee, that is things or concepts, gives birth to the knowledge. As man knew more and more about entities, knowledge grew. In order that the already gathered knowledge may not be lost to posterity, it was recorded and stored. Due to three great characteristics of man i.e. longer in age, living of three generations in a family within society and the faculty to reason and analyse, he has been able to increase his stock of knowledge. In view of the vast field of knowledge yet to be discovered, one can safely say that what we know by now is a very tiny fraction of all the entities that are unknown.

It has been noticed from ancient time that classification, right upto modern times, is one of the attempts to divide universal knowledge into its various parts and to arrange these parts in different orders, so as to bring related subjects together in some degree of affinity, thus automatically separating unlike subjects. There should be provision for all subjects, past, present and so far as is possible future.

The study of the field of knowledge is of importance to many subject experts. Subjects which study the field of knowledge within their disciplines are epistemology, psychology of knowledge, sociology of knowledge and classification of knowledge. Epistemology, being theory of knowledge, is concerned with topics like nature of knowledge, sources of knowledge, limits of knowledge, and velidity of knowledge. Psychology of knowledge deals with mental activity of knowing. Emphasis is given on subjective aspect of knowledge.

Knowledge of classification, groups, divides and registers, things and ideas in an unlimited manner but on the other hand a book is not an idea. In a sense it may be the expression of ideas, but it is infinitely more complex than any ideas. The knowledge classification arranges knowledges itself and its substances tangible and intangible whereas a book classification arranges the expression of knowledge in written or other form -- the book, manuscript or other documents. In general, it may be said at least half of the books in the world will fit logically and neatly into a knowledge classification if viewed from the standpoint we are now examining, but a good many will not do so, owing to their miscellaneous nature of subject contents or the form in which they are presented. This brings us to the outward and visible differences between knowledge and book classification.

The study of knowledge classification is however essential to the book classifier who is to understand the making and working of his scheme. The schedule of knowledge classification must be of more permanent value than that of book classification. Modern knowledge is so diffuse and complex that it is usually impossible to anticipate and provide for future trends. Any new development of science may make it necessary to have a new order in a particular section of knowledge classification - the same development can usually be accommodated in a book classification by simple interpolation.

The important views of the basis of classification is based on "type" and on definition. Type is the representative member of a class possessing the characteristic dominantly. Classification by type presupposes knowledge classification, because a type is found only by the knowledge of the general attributes of a class. Secondly, classification by type refers only to popular classification based on general resemblance and not on essential points of similarity. However, classification by type is necessary in many cases particularly where specific points of similarity are often not available.

The universe of knowledge is limited due to our limited sources. Due to the limitations of man, knowledge is limited to three spheres. They are Natural, Humanities and Social Sciences. In the general theory of classification, entities are known to us. But in the special theory of knowledge classification some of the entities are unknown and may be known only in future. This feature of knowledge classification has to do much with the problem of notation.

In the theory of knowledge classification, it is essential to equip the notation with such devices as will enable it to have unlimited hospitality in array and also in chain.

8 Division of knowledge

Knowledge classification may be divided into three broad categories:

(1) Logical (2) Philosophical (3) Scientific.

Logical classification may be stated to be mere excercise in logic. It is usually division by dichotomy as in the tree of porphry. Philosophical classification could be defined as the ground plan on which a philosopher organises his researches of the ultimate realities and by which he endeavours to communicate to others his conception of the reasons and meaning of the universe. Scientific classification seeks to formulate a scheme of mutually exclusive and exhaustive categories based on the most important characteristics of things concerned and the actual relationship between them.

9. Difference and Similarity between Knowledge and Book Classification

	Knowledge classification	Book classification
1.	Availability of Basic Classes and the isolates.	Availability of Basic Classes and the isolates.
2.	Helpful Sequences.	Helpful Sequences
3.	Array and Chain.	Array and Chain.
4.	Terms	Terms.
5.	No Notation.	Notation.
6.	No inter relationship between the isolates of a Basic Class and between the Basic Classes in the schedule.	Incidence of relations between isolates of a Basic Class and between Basic classes in documents.

7. In the schedule or chart, it is a class, neither compositenor partially comprehensive.	In documents, it is written about a class or classes composite or partially comprehensive.
8. No relation between special and common isolates inschedule.	Relations between special and common isolates are found inknowledge expounded in documents.
9. Enormous hospitality exists in array and chain of classes.	Notational limitations exists in hospitality in array and chain.
10. No physical structure, embodying subject, exists.	Physical structure of documents embodying units of knowledge exist.
11. No sequence are required.	Utilitarian sequences of documents are required.
12. No need for an index.	Index is required.
13. Place table and devices are not needed.	Place table and devices are required.
14. It should have a logical order.	It need not have a logical order, may have even a broken order.
15. It should be evolutionary in sequence.	It should not necessarily be evolutionary in sequence.
16. Need not be in a written form.	Must be in a written form.
17. It should be current and upto date statement.	It need not be a current or upto-date statement.

The essential difference between knowledge classification and book classification is that the former arranges knowledge itself while the latter arranges the expression of this knowledge, in written or other form. A knowledge classification is abstract, for ideas only are arranged, whereas a book classification is concrete and concern with ideas in their documentary representation, a much more complex form. Knowledge classification is based on preconceived ideas. Books are actual indivisible objects and their form and purpose demand special treatment in an attempt to arrange them systematically on the shelves of the library. Book classificationbecomes a method, not only for arranging ideas in the mind but also of collecting together their documentary representations so that they may be found easily. The physical form of books demands certain distinctive additions to the knowledge classification before the schedule can be termed as a book classification. They are Generallia class, Form classes or Form divisions. A notation and index are also necessary before the schedule can be used to arrange the collection of books on the shelves of library.

Richardson argues that if all knowledge could be systematically mapped according to recognized rules of division to form a complete classification of ideas, this map could be used as the basis of book classification. On the other hand Hume suggests that a book classification should be built up gradually from observations of the use made of books, rather than by following a preconceived map of knowledge based on the classification of philosophers. According to Bliss, there are two kinds of classification - One is the logical, natural and scientific and the other is the practical, arbitrary and purposive. For library purpose we should joint the two to make the classification conform to both. In this way it can be said that without knowledge classification, book classification cannot exist.

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BOOK REVIEW

Directory of Indian publishers. Editor, Dinkar Trivedi. New Delhi, Federation of Publishers and Booksellers Associations in India, 1973. xvi, 592p. Rs.50. [Reviewed by B. Guha]

That there is a genuine need, both within and outside the country, for a comprehensive directory of Indian publishers cannot be over emphasised. Even though the need has been often expressed by librarians, bibliographers, booksellers and others, yet, like the proverbial complaints about the weather without trying to do anything about it, such a directory has remained a wish only for so long. It is gratifying to note that the Federation of Publishers and Booksellers Associations has come forward to help us in this matter. That the Federation has received financial help from the governments of India and the United States, in the production of the volume, signify the enormous importance of the venture.

The Directory has listed 10, 250 commercial publishers and 900 corporate bodies. It also lists 900 'book industry adjuncts', in which category comes book designers, book exporters, book industry associations, book importers, book printers; book review media, book trade journals, foreign publishers agents, literary awards and prizes, and paper mills.

Section-1 is devoted to the listing of 'Private sector' publishers, which, for obvious reasons, fills up the bulk of the publication - running to 390 pages. The publishers are listed alphabetically under the language groups. The language groups are also placed alphabetically - from Assamese to Urdu (fifteen languages in all). Under each language group, publishers are listed in two separate categories - the first category seems to be of publishing firms, although no name has been given, and the second category lists 'author publishers'.

Section-2 deals with public sector and corporate publishers. They are listed separately under the following headings: academies, C.S.I.R., I.C.A.R., I.C.M.R., learned societies, Manager of publications, miscellaneous governments, museums, state governments, and universities.

Section-3 is a list of book industry adjuncts in separate categories like book designers etc, as mentioned earlier. Apart from these Sections which form the main part of the directory, a Geographical Index has also been provided to enable a user to refer from a place name.

All that have been said above give an idea of the scope, coverage, and the organisation of the directory. Surely, they sound quite impressive too. But the present reviewer was amazed to find the enormous amount of inaccuracies and mistakes that have gone into the span of about 600 pages. Mistakes are there on every count - in the classification or categorisation of publishers, in the presentation of information in the entries, in the alphabetisation of entires, in abbreviation, in spelling, and in fact in everything. The foreward, written by the President of the Federation, and also the publisher's blurb reveal that the directory is based on the 'research data' collected by its Editor over a period of thirty years. It is disheartening that this enormous effort on the part of the Editor could not prevent the ugly mistakes from coming into print.

As has been said earlier, the private sector publishers have been grouped under 15 languages categories. In all categories, except in Urdu, there are two sequences - first publishing houses and then the author publishers. This simple classification, however, is also not very convincing. There appears to be some inaccuracies. As for example, in the language group, Bengali one finds such names as Bandhab Pathagar, Bimsa Satabdi, Chotader Jagat, Tapendrasmiriti Asar, Biplabi Komiunist and many more as author publishers. Those who can understand the meaning of the above terms will be amused. At the same time publishers like Biswajnan, Rupasi Bamla, etc are mentioned both as publishing houses and also as author publishers. Naturally, one would doubt the very basis of this classification. Apart from this, the information give in the entries are just the name and address only in most cases. In some cases some additional information like the number of publications in print and names of proprietors, directors, editors etc of a firm are also available.

The Section-2 devoted to public sector and corporate publishers contain many more inaccuracies, some of them are real howlers. In page 410, entry no. II L S 370 (devoted to learned societies) gives the most amusing information that the Indian National Scientific Documentation Centre, from where the present reviewer is functioning, is located in Lucknow and its Director is Dr S H Zaidi ! Surely, it is to be seen to be believed. But it is there. The facts are: the institution is not a learned institution, is also not located in Lucknow and Dr Zaidi is also not its director. The information supplied is actually for the Indian Toxicology Research Centre.

Within the groupings of Academies, C.S.I.R., I.C.A.R.. I.C.M.R., and Learned Societies there are lot of mistakes. A number of C.S.I.R. laboratories has been shown under I.C.M.R. and Learned Socieities. The C.S.I.R. itself finds a place only under the Learned Societies. Similarly, some of the C.S.I.R. laboratories like the Indian Institute of Experimental Medicine, Indian Institute of Petroleum, INSDOC, etc are under Learned Societies and a few others are shown under I.C.M.R. On the other hand, institutions like the National Atlas Organisation, National Dairy Research Institute, National Sugar Institute, etc come under the C.S.I.R. list. Under the group Learned Societies, all conceivable societies, institutions, associations have come. Thus, we find Federation of India (sic) Chambers of Commerce and Industry, National Dairy Research Institute, Press Information Bureau, Structural Engineering Research Centre (a C.S.I.R. laboratory), Union Public Service Commission, University Grants Commission and many more under this group. A number of institutions have been mentioned more than once either under the same group or under different groups.

The other groups under the Corporate Bodies are also not free from blemishes. First of all what is mentioned in the contents page are not available in the text. As for example, in the contents page entries II MI 751 to II MI 762 are given to 'Other outstanding government publishers' but in the text (page 428), the same entries are given to 'Miscellaneous - Government'. It is really intriguing to find a number of short entires under the group 'State Government's' (page 431). Who is going to be helped by such entries as Director of Ayurved, Director of Port, Charity Organisation, Motor vehicles, Miscellaneous, and a host of others, without any further information. Taking, for example, the last item mentioned above, does the 'research-minded' editor wants to convey that there is a Department of Miscellaneous' in every state? If not why at all such entries.

The catalogue of errors is, no doubt, becoming longer. It would be suffice to say that one can stretch it to any length one desires. Printing errors have added to the general confusion designed by the editor of the directory. Beginning from the very first page of the Preface where one faces the line 'The directory, is devided' to the last page where one comes across such odd place names like Race Bareli, Madia, Hoogly, there are innumerable printing mistakes. In fact, there are only a few pages which will be free from some form of typographical errors. In some places the errors make the entries really amusing. Thus, there are 'S. Dharan Brahmo Samaj' (for Sadharan), Indian Diary Science Association (for Dairy), Annual Husbandry & Diary Department (for Animal), etc.

Above all, it must be said, the objective of a directory of this type should not be merely the collection of names and addresses of publishers. If a user wants to find out which are the Indian publishers who specialise in medical publications, or children's books, or art publications, or scientific periodicals, or bibliographical publications, etc, then a well conceived directory should be able to provide appropriate approach to such information. But the present directory cannot be used for such purposes. Since, the Federation of Publishers and Booksellers Associations in India is associated with this compilation, it projects a very poor image of the entire book trade in our country.

The editor has rightly concluded his preface by saying "A directory like the present one, is never completed..., as a directory is a continuous process". The Federation should take up the work of the next edition immediately. They would do well to take into confidence a major group of users, that is the librarians, for better design and presentation of the next edition.

Book selection, by Benoyendra Sengupta, with a foreward by Niharranjan Ray. Calcutta, World Press, 1974. xiv, 207p. Rs.25 or $ 5.25 or £ 1.80. [Reviewed by B. Guha].

Benoy Babu is no stranger to the library world. He is known to many more through his writings. A book by him on a subject of such general interest as book selection will be well received by librarians.

That there is no dearth of books, even excellent books, on book selection has been granted by the author. Hence, the justification for the present publication, as given by the author, is for gathering together in a handy volume 'the current trends, problems and the conclusions of surveys conducted in recent years in developed countries of the world in this area of basic professional operation' and tailoring all these for Indian conditions. Such objectives, it would be admitted, are laudable for any new publication.

This handy volume has six chapters in all, supported by a brief index. The present reviewer finds in it an attempt to provide mainly two aspects of study. One aspect is the discussion of the principles and problems of book selection and the other aspect is the presentation and annotation of the various types of book selection tools and references.

The first part dealing with the principles, mainly the first three chapters, is an able summarisation of our accumulated wisdom on this aspect of book selection. The expression 'summarisation' is intentionally used. In almost every page one finds long quotations from Drury, Haines, McColvin, Wilson and others. This naturally gives the idea that one is reading a summary of what others have said. There are many students and librarians who are prepared and eager to hear what Benoy Babu has to say. This group will be disappointed. What is more disturbing is the early revealation, as one goes through the pages, that the author has not kept one of his early promises. One is unable to find anything which resembles' the current trends, problems and conclusions... in recent years'. In other words, the author has hardly given any recent information or recent rethinking on any aspect of book selection. The documents that are mentioned as references at the end of chapters also point out this fact. Most of them are quite old publications.

The other aspect of the book i.e., introducing the various book selection tools and aids is not at all a competent and dependable guide. Here again most of the traditional old tools are cited to the exclusion of more recent tools. Thus, among the tools and bibliographies mentioned under Natural Sciences and other subject headings (p. 154-55), one does not find Jenkins' compilation. For Nuclear Physics, a bibliography of 1955 is recommended and similarly for Aeronautical Sciences, Geology, Geophysics, Zoology, the latest 'closed bibliographies' that are suggested. do not go beyond 1958. Coming under the heading 'Useful arts' one is shocked to meet the title, Index Medicus whereas this tool is not mentioned under the more specific heading Medicine.

Coming to bibliographies and lists of periodicals (p. 161-72) one can easily measure as to how far the information content is out-dated. The author very honestly mentions that the list of tools provided there is based on another work which was published in 1968. As a consequence quite a few new tools must have been missed. Perhaps, due to this dependence, even an Indian tool, viz. the Directory of Indian science periodicals, published by INSDOC is shown to have been published in 1964. The next edition of the same directory which was published in 1968 and also other directories in the field e.g. Gidwani and Navlani's directory, have all been completely missed by the author. Similarly, under Biological Sciences and Medicine, lists of periodicals published in 1955 and 1957 have been mentioned. One wonders how such out-dated lists would be of any help to any librarian for acquisition of periodicals.

In the same chapter, the reviewer found two definite mistakes. The Bibliography of scientific publications of South and South East Asia has been given an open entry (p. 147). The publication had actually ceased in 1964. The Insdoc List is shown to have been published from 1954 to 1960. This publication actually continued till 1965. Above all, one would wonder why at all these two publications are mentioned in a list of book selection tools.

The author has given some importance to a category of documents which is attaining very great importance in recent years i.e., translations. But, here again some out-dated lists and publications are mentioned (p. 178-79). There is no mention of publications like Translations Register-Index, World List of Translations, Transatom Bulletin, etc. nor agencies like NTC or ETC. To find details about cover-to-cover translations, one is referred to two old lists of D.S.I.R. and the Library of Congress.

Himmelsbach's list finds no mention here. The Commonwealth Index of Unpublished Scientific and Technical Translations is mentioned to be maintained by Aslib. This is true. But when one of the stated objectives of the author is to tailor information for Indian conditions, could it not be said that the Indian copy of this Index is maintained by Insdoc? Another mistake is again made by calling this Index a publication. This Index is actually maintained in card form.

Printing errors abound in the publication. In the very first page the eye faulters on 'callection'. Drury's Book selection is said to have been published in 1330. Errors in some abbreviated words have been more damaging. For example, one finds Catalogue of I.S.I.R. publications (may be for C.S.I.R.) in page 175, U.K. N.L.A. Bulletin (perhaps for N.L.L.) in page 168 and so on. In fact in a book published in September 1974 one would expect to find its new name i.e. B.L.L. But it is not there.

Attention has been drawn by the author specially to a chapter devoted to "Libraries and the book trade in India", which may be useful to Indian librarians. The present reviewer made some efforts to locate the chapter and it was discovered that the chapter is actually entitled "Problems relating to book order". However, the contents of this chapter also do not elevate the publication very much. The chapter ends with a long paragraph on ISBN which is taken from Harrod's Glossary.

From what have been said so far, it would appear that the author has not produced in the publication what he promised. There is neither "the current trends, problems etc." nor any special orientation towards Indian conditions. Benoy Babu, the reviewer believes, could produce both of these if he had only made a serious attempt.

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